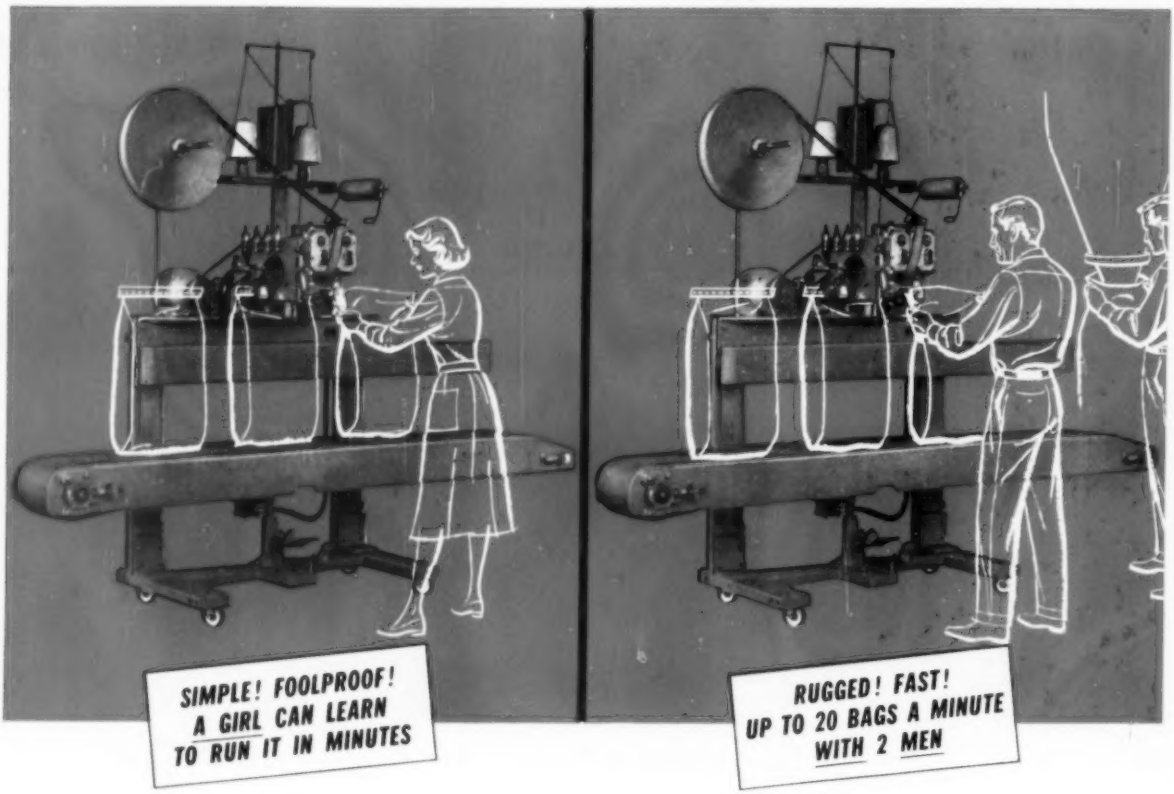
PIT & QUARRY

JULY
1958

ANNUAL CEMENT MILLS ISSUE

Best Buy in Bagclosers!



New Bagcloser Model 171

ONLY

$2650 F.O.B. Buffalo

COMPLETE WITH 9'9" SELF-LEVELING CONVEYOR, INSTALLATION and TRAINING FOR YOUR OPERATORS

Change your ideas about output and costs!
Precision-engineering brings you new Bagcloser 171.
The most efficiency and versatility for your production dollar.

Longest Conveyor. 9'9" Hydraulic "barber shop" height setting! Men stand erect. Plenty of elbow-room between fill spout and sewing head.

Automatic Stitcher Head controlled by bag passage. No inefficient one-leg hop; no tiring stoop or bend.

Fast Up to 20 bags a minute with two men, 8 a minute with one, *steadily*, because it doesn't tire workers.

Most Economical and versatile machine for chemicals, feed, fertilizers, and consumer units in SOM paper bags. Caster-mounted, it works with all weigh machines and adjusts *to* spout height.

Handles All Bags 14½" to 30" Fast, easy changeover with self-adjusting conveyor.

Explosion-Safe and Trouble-Free Pneumatic-clutch sewing head. Welded steel construction. Ball and roller bearings. Standard model wired to Nema 4 specs. Furnished to Nema 7 or 9 specs. at 1/3 optional cost of other machines.

INTERNATIONAL PAPER

BAGPAK DIVISION, N.Y.17, N.Y.

INTERNATIONAL PAPER COMPANY
220 East 42nd St., New York 17, N. Y.
Room 14040

Please send full data on Bagcloser 171.

Name_____

Firm_____

Address_____

Enter Cover 2 on card, page 211

GOODYEAR TIRES

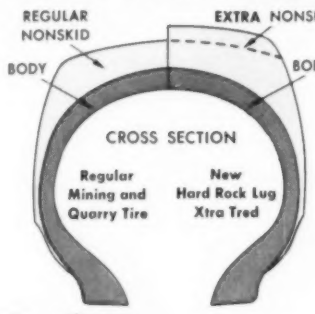
Look for this nearby Goodyear dealer sign for better tire values —better tire care.

GOODYEAR'S *NEW*

HARD ROCK LUG XTRA TRED

(Tubeless or tube-type, 14.00, 16.00 and 18.00 cross-section sizes)

BUILT SPECIFICALLY FOR MINING AND QUARRYING OPERATIONS!



Like steel, tire cord must be tempered to be tough. Goodyear's exclusive 3-T process, involving Tension, Temperature and Time, triple-tempers cord to make it TRIPLE-TOUGH – to give you longest tire life, lowest cost-per-yard!

The new Hard Rock Lug XTRA TRED is a *specialist*. It has everything the famous Hard Rock Lug family ever had – plus what it takes to keep you rolling on your roughest jobs.

More tread rubber–delivers up to 50% longer tread life. Special, tough-formula rubber holds tread cuts to new LOWS. Bigger, reinforced lugs–burlier shoulders–huskier sidewalls–add new capability, new reliability.

And it's built with Triple-Tough 3-T Nylon Cord – the greatest tire *saver* in 23 years!

The new Hard Rock Lug XTRA TRED wants the toughest tread-wearing jobs you can offer. Visit your Goodyear dealer–and start it rolling up savings!

Goodyear, Truck Tire Dept., Akron 16, Ohio.

Xtra Tred–T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

GOODYEAR

60 YEARS

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

Enter 1 on card, page 211

PIT AND QUARRY, July, 1958, Vol. 51, No. 1. Published monthly by Pit and Quarry Publications, Inc., 431 South Dearborn St., Chicago 5, Ill. Subscription price $3 for 1 year in the U.S., possessions and Canada. Sentral and South America $10 for 1 year, elsewhere $15. Single Copy $.50 except $1 for January, May and July. Entered as second class matter February 28, 1932, at the Post Office at Chicago, Ill., under the Act of March 3, 1879. Postmaster: Please send notices on Form 3578 and copies returned under label Form 3579 to 431 South Dearborn Street, Chicago 5, Ill.

pit and quarry

THE BASIC MAGAZINE IN A BASIC INDUSTRY

JULY 1958 Vol. 51 No. 1

IN THIS ISSUE:

EDITORIAL

Construction Leads the Way 10

CEMENT INSERT

Lake Ontario Portland Has U. S. Outlet 106

Modernization at Lone Star's Nazareth Plant 120

Phosphate Slurry Thinner Results at Keystone Portland's Bath Plant 135

New Cape Girardeau Mill—No. 10 in Marquette Chain 154

Nuclear Gauge Sees Through Slurry Pipe to Control Density .. 162

Factors in Design of Cement Plant Milling Rooms 163

PLANTS

Miles Co. Adds Crushing Department to Handle Oversize 92

Separate Plants Provide Aggregates, Drain Rock at Swift Dam Project 181

Full Automation, Rigid Laboratory Control Features in Newest American Rock Wool Plant 187

Uranium Boom Reason for Building New Lime Plant 191

ASSOCIATIONS

N.I.S.A. Spring Meeting Reflects Industry's Vigor 76

N.L.A. Convention Stresses Lime-Soil Stabilization, Limestone Mines as Shelters 86

FINANCIAL

Have You Checked Your Credit Rating Lately? 183

TECHNICAL

Dust Suppression Factors in Small to Medium-Size Rotary Kiln Systems (Part II) 185

LEGISLATIVE

Washington News Letter—Tax Cuts; State of Our Economy 12

LABOR

Labor Developments—Technological Change; Labor Attitudes and Bargaining Approaches 63

OTHER

Preliminary 1957 Nonmetals Reports on 13 Eastern States ... 79

Production and Value of Sand and Gravel in 1957 179

DEPARTMENTS

News of the Industry 23

Coming Events 23

Industry Personalities 34

Obituaries 36

New Machinery 48

Screenings 70

More Information Please 211

Legal Decisions 226

Manufacturers' News 232

Index to Advertisers 274

• • •

Cover Picture

● The front cover picture on this issue of PIT AND QARRY is a 4-color reproduction of one of the most unusual and impressive color photographs we have ever seen. It was taken at the new plant of the Lone Star Cement Corporation, Lake Charles, La., by a leading photographer from New York City, who made a special trip there to take this shot and others for that company.

This particular view of a kiln, stack, etc., was taken after the sun had gone below the horizon and with the moon—as can be seen—well up in the sky. We liked it so well that we asked for permission to use it on the front cover of this July Annual Cement Mills Number. This in spite of the fact that another view (black and white) of this plant was used on the front cover of the March, 1958, issue in which was featured a detailed description of the Lake Charles plant.

• • •

Published on the first of each month for producers and manufacturers of Cement, Crushed Stone, Gypsum, Lime, Sand, Gravel, Slag and other nonmetallic minerals.

Copyright 1958 by Pit and Quarry Publications, Inc., 431 S. Dearborn Street, Chicago 5, Illinois.

PIT AND QUARRY magazine was founded by H. W. Baumgartner, October, 1916.

To subscribers: When requesting change of address, kindly send old as well as new address.

PIT AND QUARRY IS INDEXED IN THE ENGINEERING INDEX

Where the going gets rough...

get tough

with Lukens "T-1" Steel!

TRADE MARK

LUKENS ®

■ Wherever rock and gravel, coal and ores come in violent contact with machine and equipment parts, Lukens "T-1" steel – *especially extra tough 321 min. BHN quality* fights back at wear and abrasion with spectacular success.

It is readily fabricated. You can form or weld it in the field or shop, from stock plate sizes immediately available. It can be used to replace or repair worn bucket teeth, truck and mine car bodies or liners, dozer blades, dipper sticks, crusher teeth, chutes, and many other parts.

Far stronger for its gage than conventional steel, it requires less metal to do equivalent jobs. It remains tough even at sub-zero temperatures.

Contact your nearest warehouse listed below, or write Manager, Marketing Service, 147 Lukens Building, Lukens Steel Company, Coatesville, Pennsylvania. Ask for special bulletin, *"Lukens 'T-1' for Toughness."*

WRITE FOR THIS BOOKLET TODAY

WAREHOUSES

Ashland, Kentucky, Mansbach Steel Co., 19th St. & River Front

Baltimore 2, Maryland, Wm. G. Wetherall, Inc., 317 President Street

Birmingham 2, Alabama, O'Neal Steel, Inc., P. O. Box 2623

Cleveland 6, Ohio, Mills-Wolf Steel Co., 10006 Carnegie Avenue

Los Angeles 33, California, The R. J. M. Company, 238 Mission Rd.

Montreal, Quebec, Can., Drummond, McCall & Co., Ltd., 930 Wellington St.

HELPING INDUSTRY CHOOSE STEELS THAT FIT THE JOB

"TIME CLOCK"
your equipment
can punch!

Automatically records

every minute of
BUSY TIME
IDLE TIME

Can save you thousands of dollars!

It's tamperproof! It automatically keeps a work record of any piece of equipment that moves. It lets you put your finger on costly delays or overtime. It records every start, stop — can even record engine idling time. Here's the business-like way to know what service you are getting from every piece of equipment.

This "Time Clock" is called

SERVIS RECORDER

It makes a clear record on permanent charts. Motion activates the recorder — no mechanical hookup is involved. *Write today!*

THE SERVICE RECORDER COMPANY
1013X ROCKWELL AVE., CLEVELAND 14, OHIO

Enter 4 on card, page 211

pit and quarry

WALTER E. TRAUFFER
Editor

HARRY F. UTLEY
Pacific Coast Editor

ROY L. PECK
Field Editor

BUREN C. HEROD
Field Editor

M. E. ANSEL
Assistant Editor

JAMES G. KOSTKA
Director of Marketing and Research

JANET M. COHN
Editorial Assistant

BETSEY Y. SHINKAWA
Editorial Assistant

JAMES E. MONTGOMERY
Chairman of the Board

WILLIAM A. WILSON
President

RAY L. SMITH, JR.
Senior Vice-President

W. T. KLUSSMAN
Secretary-Treasurer

ROBERT L. RUDD
Circulation Manager

GEORGE P. GRANT
General Sales Manager

HAROLD L. DAVIS
Production Manager

RUTH KLAR
Production Assistant

CHICAGO BUSINESS OFFICE
431 South Dearborn Street, Chicago 5, Illinois, HArrison 7-8558

FRANK J. CORNYN
Vice-President and Midwest Sales Manager

RAYMOND S. NEUWELT
Midwest Advertising Manager

NEW YORK BUSINESS OFFICE
370 Lexington Avenue, New York 17, N. Y., MUrray Hill 5-4455

JOHN R. DUBLE
Vice-President and Eastern Sales Manager

RICHARD J. MURPHY
Eastern Advertising Manager

W. H. L. GETZ
Representative

CLEVELAND BUSINESS OFFICE
432 The Arcade, Cleveland 14, Ohio, CHerry 1-4431

CHARLES H. BUSSMANN
Vice-President and Central Sales Manager

J. G. JOHNSON
Central Advertising Manager

RALPH G. SCOTT
Representative

WEST COAST OFFICE
HARRY F. UTLEY, 820 N. Magnolia Avenue, Whittier, California

REPRESENTATIVES

FRED W. SMITH
1201 Forest View Lane, Vesthaven, Birmingham 9, Ala., TRemont 1-5762

THE McDONALD-THOMPSON CO.
San Francisco, California

EDWARD T. THOMPSON
3727 W. 6th Street
Los Angeles 5, California

T. HARRY ABNEY
National Building
Seattle 4, Washington

ROY M. McDONALD
625 Market Street
San Francisco, California

ROBERT H. HEIDERSBACH
222 Colorado National Bank Bldg.
Denver 2, Colorado

FRANK N. VICKREY
3217 Montrose Blvd.
Houston 6, Texas

TED R. TRAUTMANN
2010 South Utica
Tulsa 4, Oklahoma

Enter 5 on card, page 211 →

THIS IS THE KIND OF JOB IT'S BUILT FOR!

Built as a Rock Shovel it gives you what you expect of a rock shovel. This big 80-D, 2½ yd. Northwest is one of the seven Northwests bought by Clement Bros., Inc., of Lenoir, N. C. The fact that they have bought seven, shows in itself what kind of service their Northwests have given them.

This Northwest is working in their quarry at Greenville, S. C. in the kind of brutal digging that beats ordinary equipment to pieces.

Northwests are built for Rock Work. Machinery Bases are rugged, heat treated alloy steel castings with cast machinery side frames. Realize what this means. It assures a lifetime of permanence of shaft alignment. It eliminates weaving that is the direct cause of wear. There is nothing else like it.

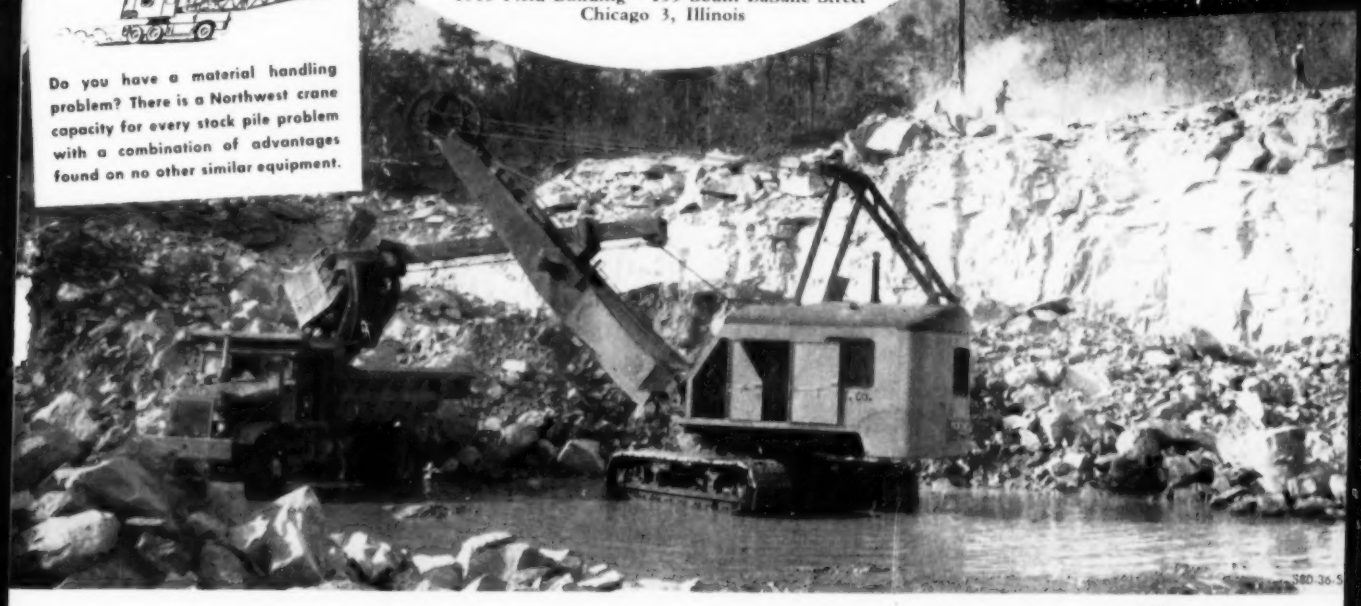
You can go through the whole machine—Booms!—Sturdier for workhorse digging and lifting. Uniform Pressure Swing Clutches! — cooler running, trouble-free. The Helical Gear Drive! — running in oil, mounted on anti-friction bearings free from the adjustments and stretching that comes with chain drives. The "Feather-Touch" Clutch Control! — with the *feel of the load* free from the complications of delicate mechanisms, valves, pumps and tubing. The Cushion Clutch, a wide range of Boom Hoist Equipment to choose from, Easy Convertibility — These and many more advantages give you a piece of equipment with ability that you can't find anywhere else for handling the workhorse jobs and making money.

If you are planning on new equipment there are many other Northwest advantages you should know about. Let a Northwest man fill in the details.

NORTHWEST ENGINEERING COMPANY
1515 Field Building • 135 South LaSalle Street
Chicago 3, Illinois

THE SEVENTH **NORTHWEST** *Bought by Clement Bros., Inc., Lenoir, N.C.*

Do you have a material handling problem? There is a Northwest crane capacity for every stock pile problem with a combination of advantages found on no other similar equipment.

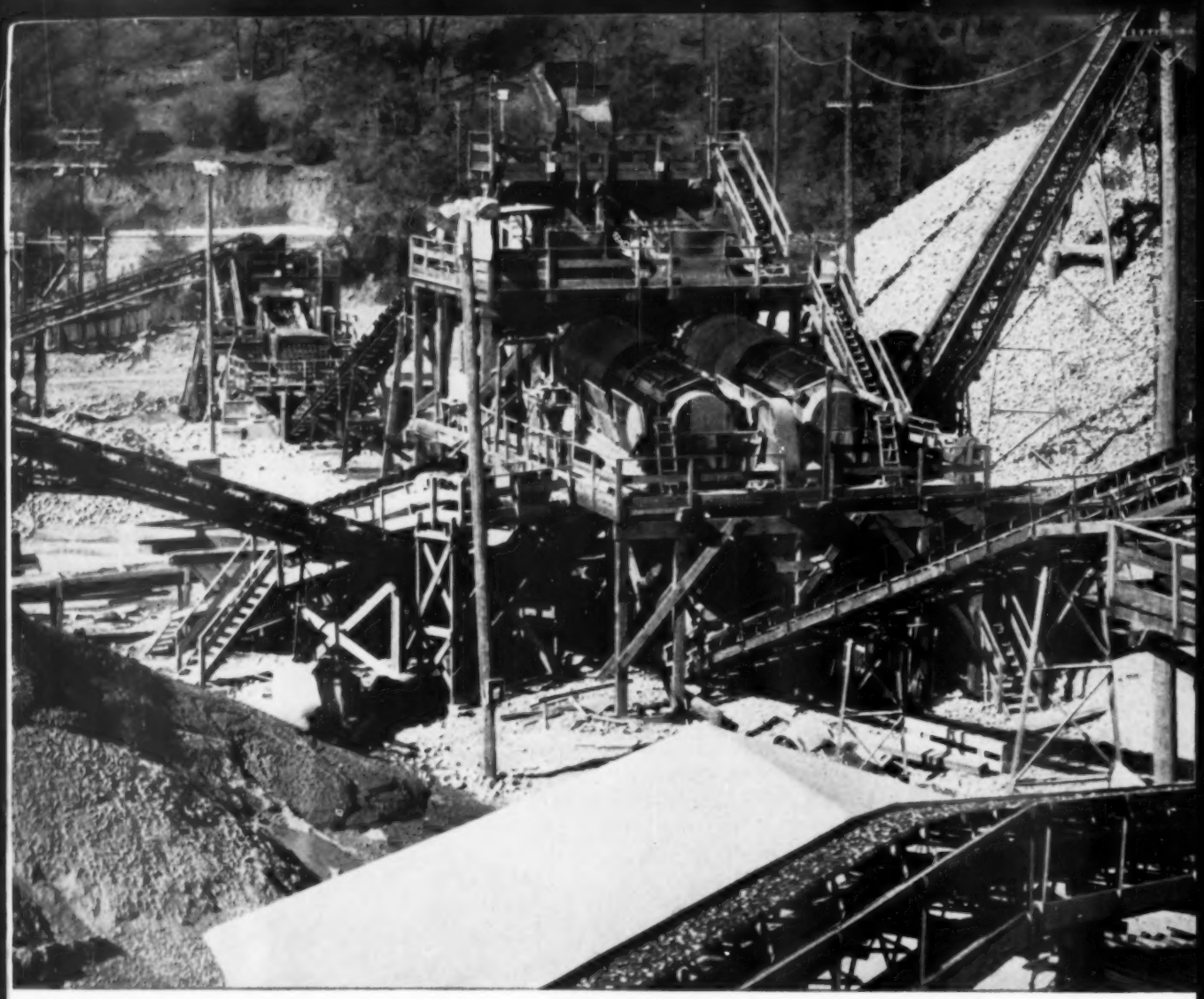


NORTHWEST EQUIPMENT IS BUILT IN THE FOLLOWING SIZES

SHOVELS	CRANES	DRAGLINES	PULLSHOVELS	TRUCK CRANES
¾ Yd. to 2½ Yd. Capacity	13-Ton to 50-Ton Capacity	¾ Yd. to 3 Yd. Capacity	¾ Yd. to 2½ Yd. Capacity	25-Ton and 35-Ton Capacity

THE GREATEST COMBINATION OF PROVED ADVANTAGES EVER BUILT INTO A SHOVEL, CRANE, DRAGLINE OR PULLSHOVEL

NORTHWEST



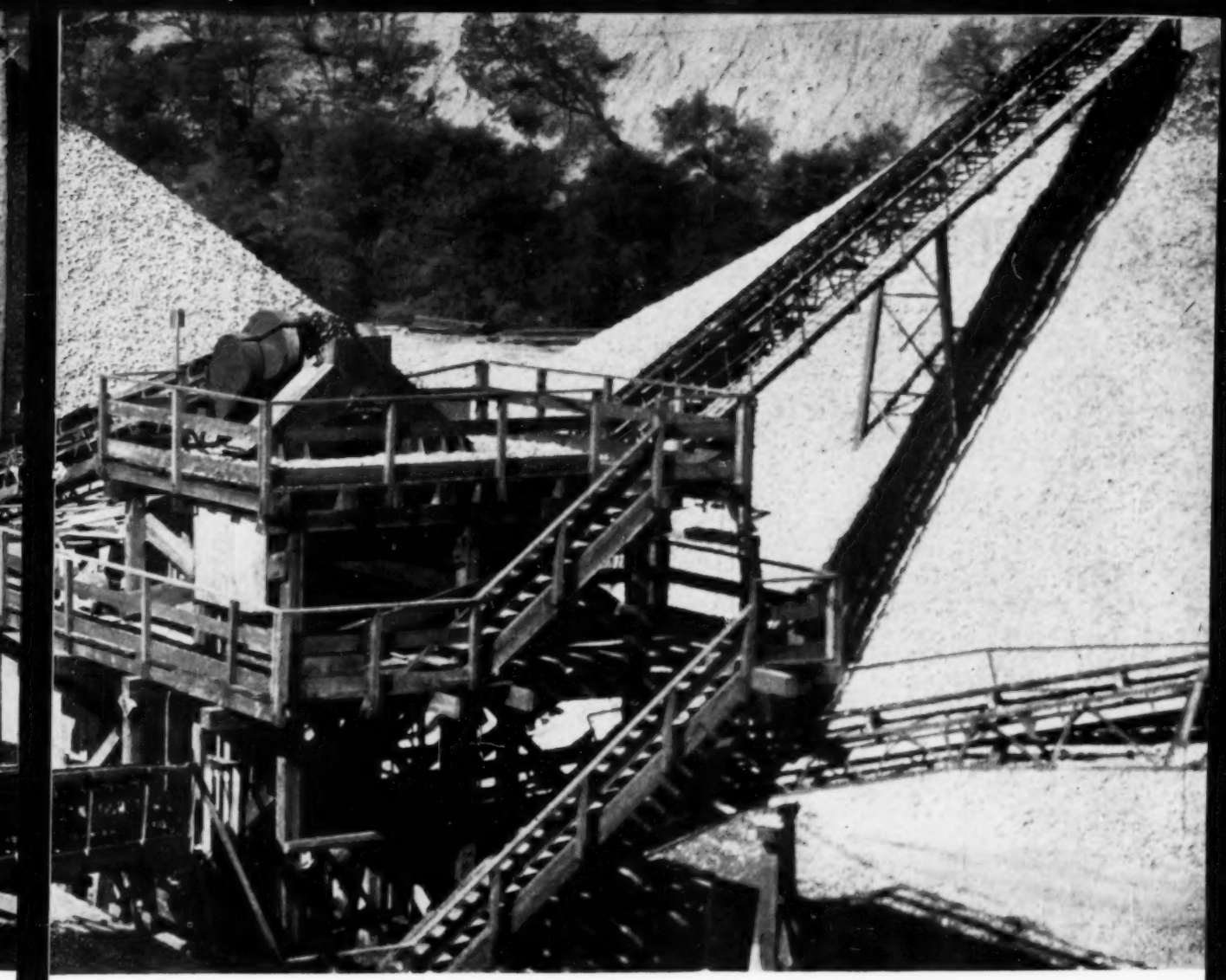
Six Texaco lubricants can solve all your major lubrication problems with the

Texaco Simplified Lubrication Plan

Fewer lubricants means fewer storage, handling and inventory problems, plus complete lubrication protection.

In a big operation like this aggregate plant, Texaco's Simplified Lubrication Plan contributes to overall efficiency by assuring that you get the *right* lubricants for all major equipment. The Texaco Simplified Lubrication Plan developed for your operation may call for as few as 6 lubricants, yet they will handle all major lubrication . . . reduce storage problems, handling costs, and minimize the chance of using the wrong lubricant for the job. And the Texaco Lubrication Engineer will make sure that the lubricants you use are tailored to your operation. It all adds up to equipment that's more efficient—and systematic lubrication that's simple, time-saving and economical.

Here are some of the products that can handle



all your major lubricating problems:

Texaco Ursa Oil Heavy Duty, fully detergent and dispersive, to keep heavy duty gasoline and diesel engines clean and economical.

Texaco Marfak, has a wide temperature range, high resistance to shock loads, seals out dust and dirt, prevents rust.

Texaco Regal Oil R&O for air compressors and hydraulic systems, a high-grade lubricant fortified with rust and oxidation inhibitors; assures trouble-free operation.

Texaco Universal Gear Lubricant EP, assures long life for transmissions and differentials.

Texaco Track Roll Lubricant, specifically designed to protect rollers against rust and wear.

Texaco Rock Drill Lubricant EP for longer drill life and full protection against rust, whether drills are running or idle.

Your local Texaco Lubrication Engineer can give you complete details on the Simplified Lubrication Plan. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

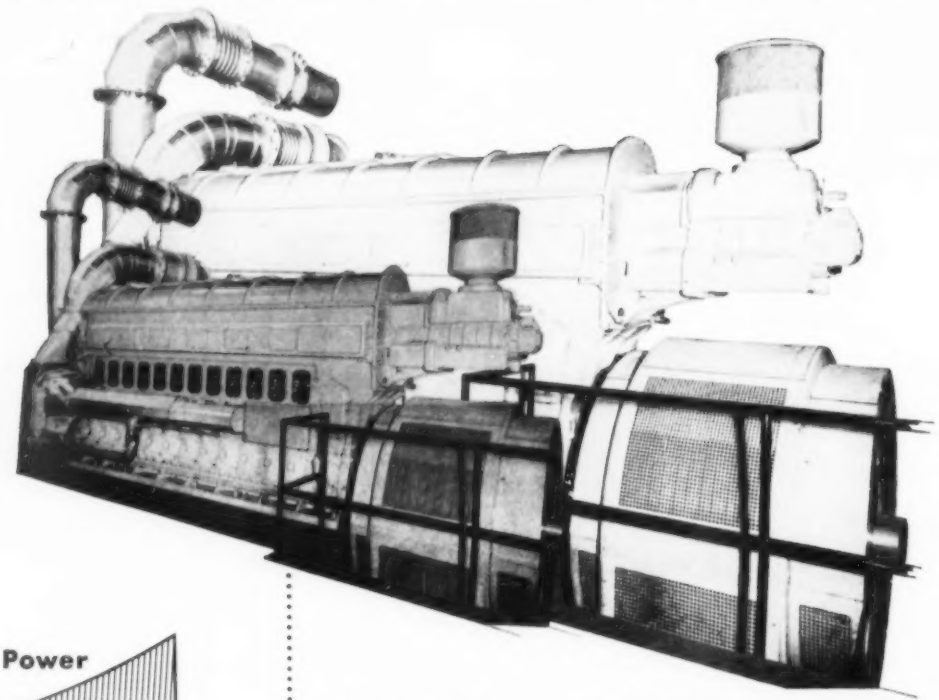
The Texas Company, 135 East 42nd Street, New York 17, N. Y.

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

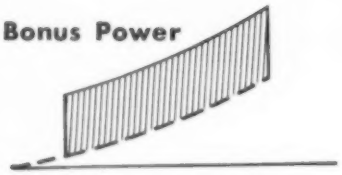
(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

Enter 6 on card, page 211

50% More Power with Fairbanks-Morse TURBOCHARGED OPPOSED-PISTON DIESEL



Bonus Power



⅓ LOAD FULL LOAD

Auxiliary blower is automatically declutched at loads above approximately 1/3 rating to deliver more usable power at the flywheel.

Increased Thermal Efficiency

Turbo-charged Fairbanks-Morse Model 38TD-8 1/8 Opposed Piston Diesel is approaching a new high of 40% efficiency.

New Efficiency...New Power...New Fuel Savings For Marine and Stationary Applications

The industry's most compact, simple, and dependable diesel—the Fairbanks-Morse Opposed Piston—*is now turbo-supercharged!* Fuel savings from 5% to 10% are effected on full-load operations—even more on part loads. And 50% more power has been added. At 900 rpm, for example, it is conservatively rated at 300 hp per cylinder. Yet it occupies vitually the same space as the non-supercharged version...weighs only about 8% more. Look at the advantages in this usually low size and weight per horsepower.

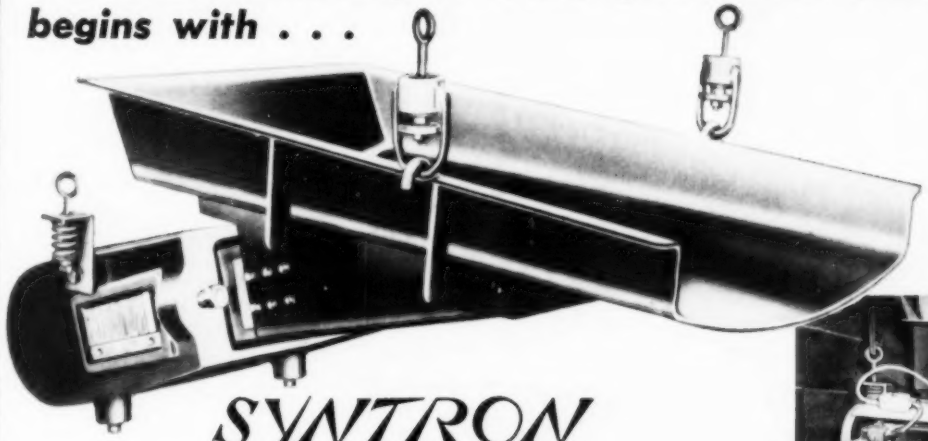
Stationary installations—save on foundation and building costs.
Commercial marine use—more power, speed, fuel and cargo capacity.
Portable operations—save with most compact power available today.

Greater power is available at higher altitudes because the engine is less sensitive to atmospheric pressure. Oil and water cooling requirements show almost no increase at the higher output. It's all possible with careful matching of system and engine. Divided manifolds permit use of exhaust pulses with no pressure cancellations. Engine-driven auxiliary blower provides scavenging air up to ⅓ load—declutches above this figure to make additional power available at flywheel. For full information write Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.

FAIRBANKS-MORSE
a name worth remembering when you want the BEST

DIESEL AND DUAL FUEL ENGINES
DIESEL LOCOMOTIVES • RAIL CARS
ELECTRICAL MACHINERY • PUMPS
SCALES • HOME WATER SERVICE
EQUIPMENT • MAGNETOS

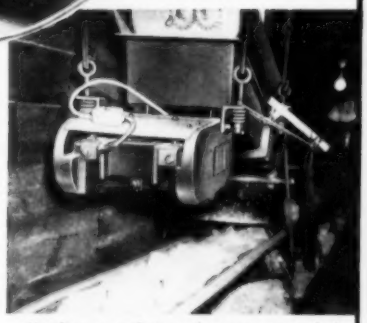
Profitable handling of sand, gravel and stone begins with . . .



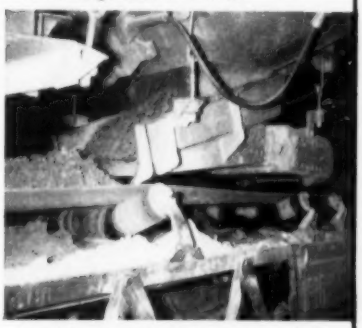
SYNTRON

"Vibra-Flow"

VIBRATORY FEEDERS



Feeding run-of-pit rock to conveyor belt
Note: large rock and fines



Feeding damp sand to conveyor belt
Note: SYNTRON Vibrator on sand hopper

SYNTRON Vibratory Feeders combine efficiency, dependability and durability to provide controlled rate feeding of bulk materials—from fine powders to run-of-quarry rock, hot or cold, dry or damp—to hammer mills, crushers, screens, driers, ball mills and other processing equipment.

SYNTRON Vibratory Feeders are made in a series of single electromagnetic drive models with maximum capacities ranging from 25 to 1,000 tons per hour — and up to 3,000 tons per hour with multi-electromagnetic drive models. All with variable control of feed rate — for operation from 230 or 440 volt, 60 cycle a-c.

SYNTRON Vibratory Feeders can provide the dependable answer to a lot of your bulk materials handling problems.

Send details to our application engineers for recommendations and quotations.

Other SYNTRON Equipment

designed to increase production, cut production costs, improve products

Vibrators (bins, hoppers, chutes)
Vibratory Feeders
Vibratory Screens
Shaker Conveyors
Vibratory Elevator Feeders
Weigh Feeders
Packers and Jolters
Hopper Feeders
Lapping Machines
Rectifiers (Silicon and Selenium)
a-c to d-c Selenium Rectifier Units
Electric Heating Panels
Electric Heating Elements
Sinuated Wires
Shaft Seals
Electric Hammers
Concrete Vibrators
Paper Joggers

Our representatives will be glad to work with you in selecting the proper equipment for your operation.

Call your nearest Syntron representative.

Builders of Quality Equipment for more than one third of a century. RP158

Write for a *SYNTRON* illustrated catalog—FREE

SYNTRON COMPANY
385 Carson Avenue **Homer City, Penna.**

The Editor's Page

Construction Leads the Way

THERE is increasing evidence that the present business recession has reached bottom, and that we are beginning to come out of it. Indications are mixed but the favorable ones are weighing more and more heavily in the balance, as is evidenced in the recent upward movement in the stock market. Probably the best indicator is the fact that construction, after a slump early in the year, is also heading back toward peak levels, not only in dollar volume but in actual physical volume as well.

According to the latest official reports, the construction industry is living up to the predictions made earlier in the year—that construction dollar volume in 1958 would exceed the $47.2 billion record total of 1957. The latest F. W. Dodge Corporation report shows that May construction contracts totalled $3,402,575,000, the highest figure ever reported for any single month. Total construction contracts for the first five months were $12,983,524,000, down only 5 percent from 1957 after a very slow start.

THE 1958 dollar volume construction figures are made all the more impressive by the fact that contracts are now being bid at well below last year's figures. Estimates of the amount of reduction vary from a 10 percent average to as much as 40 percent in some cases. This is apparently largely because there are now too many contractors, even for the huge volume of work in sight, and they are cutting prices. The recent cuts in interest rates also undoubtedly had some effect as many contractors depend heavily on bank loans.

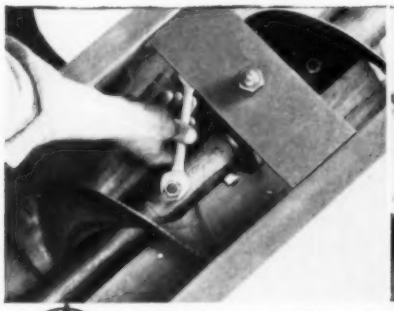
The lower construction costs and interest rates are also apparently spurring public and private construction projects that had been deferred, and are inspiring a growing number of new projects. The lower construction costs also mean that at a given dollar figure there will be more physical volume—more labor, materials, and construction machinery.

Most of the official sources of figures on construction, unfortunately, give information only in dollar volume, making no adjustment for variations in the cost of construction. This practice has been very misleading, especially in recent years when such costs have been rising rapidly and steadily, giving the impression that the volume of construction was much higher than was really the case.

ANY increase in actual construction volume is, of course, automatically accompanied by a similar increase in the demand for construction materials, including cement, aggregates, lime, etc. Estimates at the start of the year were that the cement industry would just about regain the 6 percent drop in shipments in 1957 from the 1956 peak. Actually cement shipments, after a slow start, picked up rapidly in April and May, and in June they should go ahead of the first half of 1957. Aggregates shipments, which in 1957 set a new record by a small margin, follow the same general trend as cement. These building materials are in an enviable position this year and their long-term prospects are even brighter.

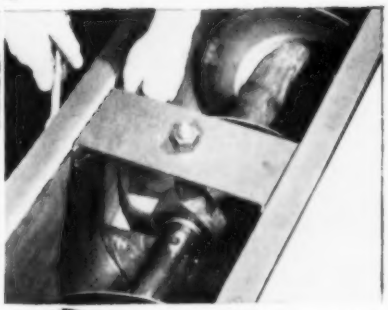
Walter E. Trauffer

First time you've ever seen a conveyor screw changed so fast!

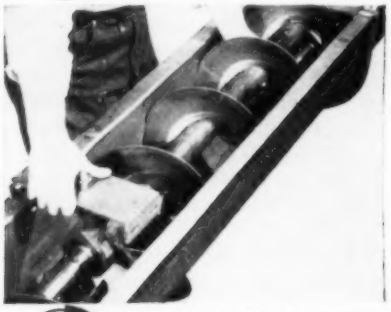


First, take out coupling bolts and filler piece from right-hand end of section to be removed.

Second step: take out coupling bolts and filler piece from the preceding section.



Rotate screw being removed 180 degrees so slot on preceding section is up. Then unbolt hanger.



Now simply lift the conveyor section from the trough and assemble the new one in its place.

RUNNING AGAIN. After less than 30 minutes, the conveyor is back at work.

LINK-BELT Quik-Link conveyor screw eliminates need to pull down entire conveyor line

Down-time is held to the barest minimum with the Quik-Link conveyor screw. It speeds and simplifies the maintenance man's job . . . other components need not be dismantled. And Quik-Link is just one of a whole group of new Link-Belt screw conveyor components that are cutting maintenance and power demands to a new low.

- *BALL BEARING HANGER*—has self-aligning bearing and seal, adjusts to deflection.
- *BALL AND ROLLER BEARING COUNTERSHAFT END*—connects two conveyors at right angles, permits use of a right-angle drive.
- *TROUGH END SEAL*—keeps grease in, dirt out. Used with lip, felt or waste packing seal to prevent bearing-product contact.
- *DOUBLE BALL BEARING FLANGE BLOCK*—resists overhung loads at drive end and takes thrust loads of screw.

For complete facts, call your nearest Link-Belt office or authorized stock-carrying distributor. Or write for Folder 2489.

LINK-BELT

SCREW CONVEYORS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 14,083

Washington News Letter

By S. HERBERT UNTERBERGER

CONGRESS is already in a going-home mood. This means that in the absence of any dramatic events, such as a major stock market break or a new Russian advance, nothing that is not already well under way has much of a chance of being passed in this session.

Tax Cut Very Unlikely

Despite all the talk, no substantial action has been taken to effect a reduction in taxes. As a matter of fact, the one piece of legislation that has made any advance does just the opposite. It extends the present excise and corporate tax rates for another year. This is what the President wanted, and so far, the House of Representatives has given it to him. Unless a presently unforeseen revolution occurs, the Senate is expected to do likewise.

Many people in Washington hoped that, at least, some reductions would be made in the present level of excise taxes. The best case for such a reduction was in connection with automobiles. Here there was an industry which, beyond doubt, played a critical part in sparking the present recession and which urgently needed stimulation.

However, when a reduction in the excise taxes on new cars began to be considered seriously, it became immediately evident that if a cut were granted, the pressure for other excise tax reductions would mount to such a point as to be irresistible. The end effect would be either a general reduction in excise taxes, or none. At present, the most likely result is that there will be none.

The same practical politics, rather than the economic realities, appear to be determining the outlook for corporate or individual income tax deductions. Even a small reduction in corporate taxes is expected to result in considerable pressure for at least similar reductions in the individual income tax rates. And it is feared that consideration of even small reductions in income tax rates will result in heavy pressure for further reductions all along the line.

Apparently, this fear of starting something that may not be able to be stopped is preventing Congressional tax action despite a widespread demand for it, not only from labor groups but also from many highly respected business groups such as the Committee for Economic Development and the U. S. Chamber of Commerce.

The fact that the Administration is officially opposed to cutting taxes at this time provides most members of Congress with a sufficient reason for inaction. By this time, however, it has become clear that this position is far from unanimous in the Administration. Although the Secretary of the Treasury is certainly the most powerful supporter of maintenance of the current tax level, the Secretary of Labor is clearly opposed to it. The Vice-President also appears to favor tax reduction, at least in his public statements, although he does not seem to be exercising any substantial influence on behalf of this position.

The State of the Economy

Whether you think the economy is going up or going down probably depends upon which analyst you have read last. Out of the welter of diverse statements, it appears obvious that, at the moment, nothing decisive is happening in either direction.

To be sure, employment rose from April to May by a little more than one million, but unemployment fell by only about 200,000. From May to June, employment is expected to rise even higher, primarily because of the seasonal requirements of agriculture and the construction industry. But unemployment is also expected to rise, primarily because of the large number of graduates—about 400,000—who will be thrown on the labor market.

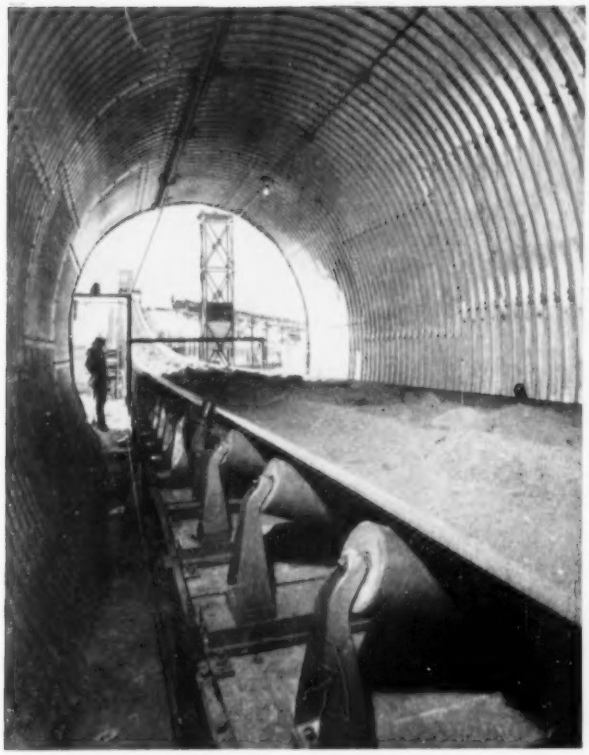
A significant item in employment statistics which has received far less emphasis than it deserves is that, despite the general employment rise between April and May, employment in manufacturing, where the recession is concentrated, fell by an additional 29,000. This occurred despite a small rise in the output of the steel industry from 56 to 58 percent of capacity. If this lag in manufacturing employment continues, the optimistic talk heard in recent weeks will turn out to be sheer whistling in the dark.

While the Administration was issuing press releases with as much optimism as could be mustered, another agency, not subject to Administration control, dropped its bombshell of pessimism. This was the report of the staff of the Congressional Joint Economic Committee. This group, composed of senators and congressmen, which was established by the Full Employment Act to receive and analyze the Presidents Economic Report, employs a staff of economists which are the counterparts of the President's Council of Economic Advisors.

Their recently issued report shows that on the basis of optimistic assumptions, unemployment will show little improvement this year, and that next winter it will be at least as high as the recent level of 5 to 5½ million. It was stated that under less optimistic assumptions unemployment would rise to 7 million in the first quarter of 1959.

(*Continued on page 64*)

Use Armco Corrugated Structures for economical, easily-built conveyor tunnels



It pays to specify Armco Corrugated Metal Structures for durable, low-cost conveyor tunnels under aggregate piles and storage bins. The high strength/light weight ratio of corrugated metal means fast, easy installation. An Armco tunnel can take the rugged service and heavy loads common in materials handling. Storage piles up to 100 feet or more over Armco Structures are not unusual.

Armco Corrugated Metal Structures are also widely used for conveyor covers, storage bins, and drainage under access roads. The coupon below will bring you helpful, authoritative data. Armco Drainage & Metal Products, Inc., 5628 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation.

Gates for controlling various sizes and grades of material can be installed wherever needed in Armco Structures.

Armco Corrugated Structures have ample strength to handle heavy storage pile.

ARMCO DRAINAGE & METAL PRODUCTS, INC.
5628 Curtis Street, Middletown, Ohio

Send me more information on Armco Corrugated Metal Structures for ☐ Conveyor tunnels ☐ Other uses _____

NAME _____ TITLE _____

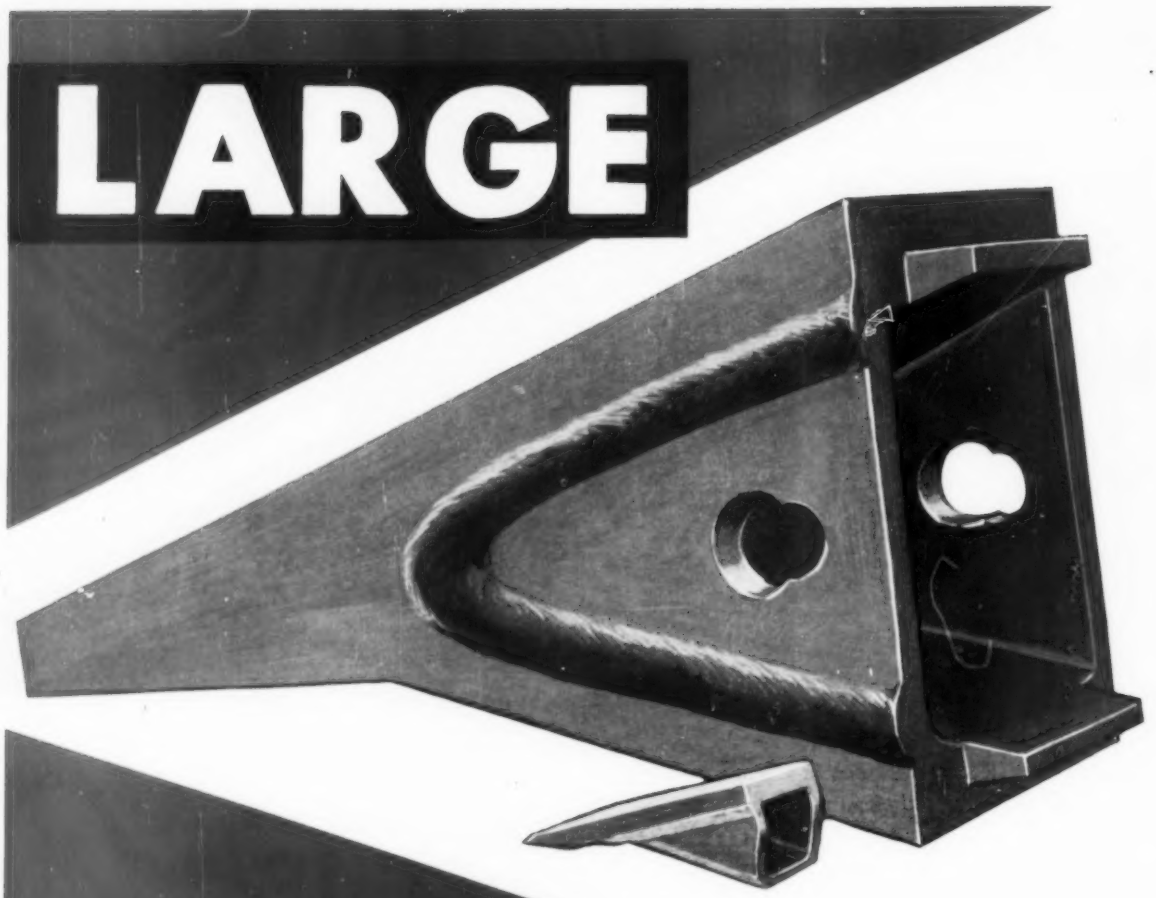
ORGANIZATION _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

ARMCO®

LARGE



or small

H&L leads the field with

Teeth that really dig!

H&L **TOOTH COMPANY**

1540 South Greenwood Avenue Montebello, California

DIAMOND **STATIONARY PLANTS**

How Diamond put a gravel deposit in business

Check This Layout

- a trap loading hopper equipped with a grizzly and plate feeder
- three 24" lattice framed belt conveyors
- 2 wash boxes
- a 3 deck and a 2 deck water screen equipped with spray bars
- a screw washer
- a 10"x36" jaw crusher
- a 30"x20" roll crusher
- a 24" DorrClone
- 4 portable stockpiling conveyors

Diamond makes everything for the aggregate producer:

Jaw Crushers • Roll Crushers • Conveyors • Screens and Washers • Feeders and Bins • Portable and Stationary Crushing Plants for Rock and Gravel.

The owner of a Northern Illinois gravel deposit had a problem. A ready market existed for finished aggregate products that could meet the rigid specifications of state and local highway programs. Could such materials be produced from his property in adequate quantity . . . and at a profit. He turned to Diamond . . . today he has a profitable operation.

Experienced engineers surveyed the site, checked the type of material in the pit, verified the finished products wanted, and determined the production capacity that would be needed. Then they submitted detailed sketches, specifications and costs for a complete plant layout. Approval was received and in a matter of weeks another Diamond engineered and built plant was making money for its owner.

Arranged in a space-conserving layout, the plant is producing four profitable materials at the rate of 70 to 150 cu. yds. per hour, depending upon the amount of each product desired; washed concrete sand, washed natural gravel in two sizes (1¼" to ½" and ½" to #4 mesh), and 100% crushed, screened and washed gravel in either 1" to #10 mesh or ⅜" to #10 mesh. All meet state, county and township road specifications.

The entire plant is electrically driven with all wiring underground. It requires a minimum of supervision with one man handling the operation . . . typical of Diamond's thoroughness and ability to provide the best knowhow and equipment for any size job. It's a good example of how Diamond can tie-up high capacity, smooth operation and low production costs in one neat profit package for you. See your Diamond Distributor today.

DIAMOND IRON WORKS

DIVISION

GOODMAN MANUFACTURING COMPANY

Halsted Street and 48th Place • Chicago 9, Illinois

(Above) Aggregate travels 800 feet on four 24" belts before it is loaded onto a 500' x 24" under-the-road conveyor belt.

Photos courtesy Barber-Greene Company, Aurora, Illinois

Hamilton Conveyor Belting

By pushing a button . . .

One man moves 75 million tons along Hamilton Rubber conveyor highway

The control tower operator of this mid-west sand and gravel company can start and regulate the movement of 75,000,000 tons of aggregate on 16 Barber-Greene conveyors, equipped with over 5,000 feet of Hamilton Belting, even to positioning and loading the barges!

One section of this conveyor system travels under a state highway. The need for expensive haulage equipment was eliminated because of this unique conveyor system; work stoppage totaled one week out of a full year—and then only because of sub-freezing weather.

Hamilton Conveyor Belting, installed on Barber-Greene materials handling equipment carries the aggregate from the pit to the surge pile. A tunnel conveyor under the surge pile delivers the aggregate to the screening plant. After processing, conveyors carry each type of material to its stock pile. Tunnel conveyors under the stock piles deliver single, or blended types of material to the barge loading conveyor.

Three ground men, under the direction of the tower operator, assist him in operating the plant. A drag line operator in the aggregate pit loads a feeder positioned over the first Hamilton Conveyor Belt. His oiler shares lubricating duties for the entire plant with the barge man. The barge man attaches the tag line to the barges, and operates the conveyor loading gates under the stock piles.

Only equipment of the greatest dependability and highest quality can serve an automated operation of this type. Hamilton Conveyor Belting was selected for the job because its dependability and fine quality has been proven on thousands of jobs under every conceivable working condition.

(Above) The 160' x 30" belt in foreground discharges material from upstream stock piles onto 470' x 30" belt which also withdraws material from downstream stock piles, and loads barge. **(Upper Right)** Aggregate is delivered to washing, crushing and screening plant via 185' x 24" tunnel conveyor belt from surge pile. Conveyors carry finished products to stock piles. The 470' x 30" belt, and a 250' x 30" belt run under the stock piles.

Maintenance cost about $100 for 600,000 tons hauled.

This included repairs on all haulage equipment! Hamilton can cut your conveyor belt maintenance costs to a similar low level through its marked superiority of materials and construction. The "Cushion Covers", for instance, are compounded to meet your job requirements; from heavy, jagged loads to light, abrasive materials. Heavy, reinforced edges are standard. A breaker fabric, for extra cushioning, can be included. Fabric plies are impregnated with rubber to add strength. Rubber skim coat, inserted between plies, acts as a resilient bed.

For more information write Hamilton, Dept. DD for our new Belt "Check-Up" Brochure.

Hamilton Rubber

MANUFACTURING CORPORATION, TRENTON 3, N. J.

A Division of Acme-Hamilton Manufacturing Corporation

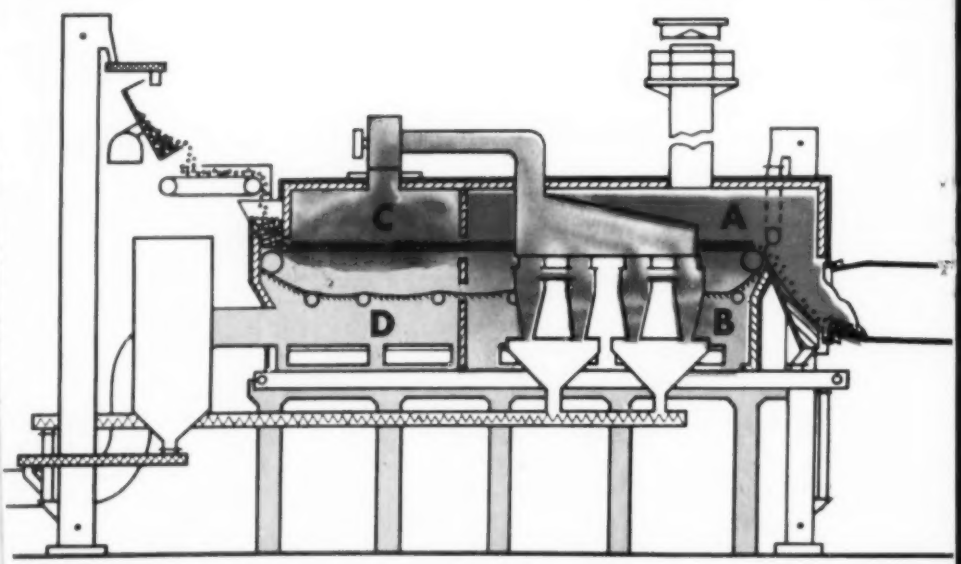
ATLANTA • CHICAGO • HOUSTON • PITTSBURGH • INDIANAPOLIS • LOS ANGELES • NEW YORK • SAN FRANCISCO

(Above) 500' conveyor belt delivers aggregate to surge pile.

Clean and...

EFFICIENT

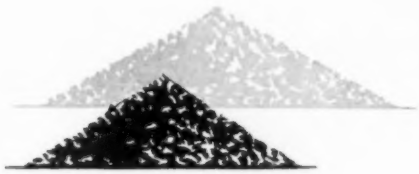
THE ACL SYSTEM



ACL is an Allis-Chalmers trademark.

Enter 18 on card, page 211

A new concept in cleanliness! The new *ACL* system offers lower dust loss — cleaner cement production. Stack discharge is merely a wisp. Complete dust-free plants have been constructed within large cities and in suburban neighborhoods. The system meets even the most stringent municipal air pollution codes. Other advantages are: maximum burning efficiency, reclamation of material, power savings and small space requirements.



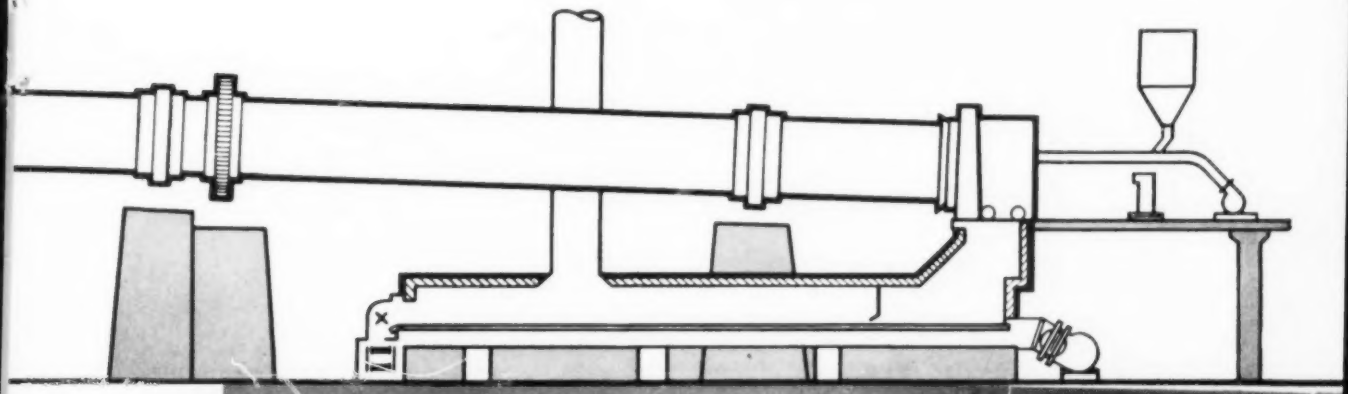
40% less fuel per barrel of clinker

ACL systems now in operation consume fuel at an average of 600,000 Btu per barrel of clinker. Compare this to fuel requirements of conventional long, dry-process kilns which use from 800,000 to 1,000,000 Btu. And the *ACL* double-pass system is designed to use any conventional fuel—powdered coal, fuel oil, natural or coke oven gas.

For details, ask your A-C man for a copy of Bulletin 07B8431. Or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin.

How the *ACL* double-pass system works

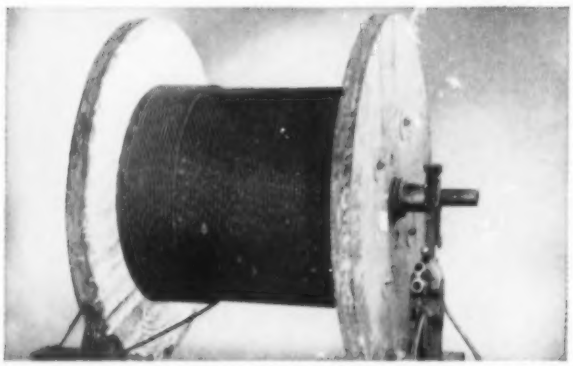
Partial calcining and dust reclamation take place as hottest gases pass through pellet bed on traveling grate. Gas temperatures are reduced from about 1800 to 500 degrees in this first pass (A to B). Next, gases pass through cyclones where larger dust particles are removed, and carried back to pelletizer. Final dust filtering takes place as gases pass through moist pellets on feed end of grate. In the second pass (C to D) gas temperatures are reduced more. Heat of kiln gases is transferred to material.



ALLIS-CHALMERS

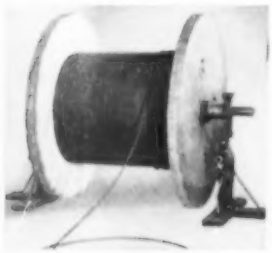
Tuffy® Wire Rope

How to Get Longer Service from Wire Rope: Proper Unwinding, Socketing, Seizing, Clipping



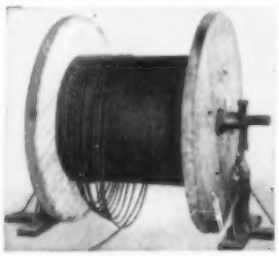
Here's the way to set up reel for unwinding

The stock reel should be set up on jacks, so the rope will come from the under side of the reel as shown in this picture.



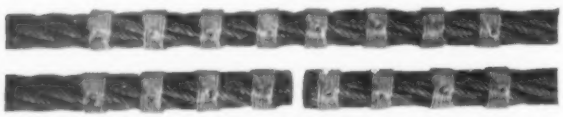
Reel set up WRONG

The rope is coming from the top of the reel and forming loops as the reel over-runs. These loops are likely to form kinks and dog-legs, which can be ruinous to rope life.



Reel set up RIGHT

Unwinding has started, and the reel is spinning faster than the rope is being pulled off. But because it's coming from the under side of the reel, the rope is simply loosening on the reel, with no damage.



Simple way for PROPER SEIZING

Since practically all wire ropes today are preformed, we suggest that when cutting you put only one seizing on each side of the cut.

For ropes other than preformed, *three* seizings should be used on each side of the cut so there will be no misplacement or relative movement of strands. *Four* seizings on each side are required for a lang lay rope, or any rope having an independent wire rope core or a wire strand core. *Four* seizings are also needed for all 18x7 ropes, and all ropes larger than 1" diameter.

Fig. 1 Fig. 2 Fig. 3 Fig. 4 Fig. 5 Fig. 6

Nine Steps of Correct SOCKETING

1. Securely seize and serve with soft wire ties before cutting, and have at least two additional seizings placed at a distance from the end equal to the length of the basket of the socket.

2. When the rope is properly seized, take off the end seizing. Cut the fiber center back to the seizing, as shown in Fig. 1 above. Untwist and broom out the wires. See Fig. 2.

3. Clean the wires for the distance they are to be inserted in the socket. Use benzine, naphtha, gasoline or other solvent. Then wash off in boiling water or boiling ammonium chloride used in Step 5.

4. Then dip cleaned wires in commercial muriatic acid to a depth not greater than ¾ of the cleaned length of wire. Keep the wires immersed for 3 minutes, or until the acid has thoroughly etched each wire. Be sure acid does not contact any other portion of rope.

5. Immerse wires into boiling ammonium chloride. A white coating will be left on the wires.

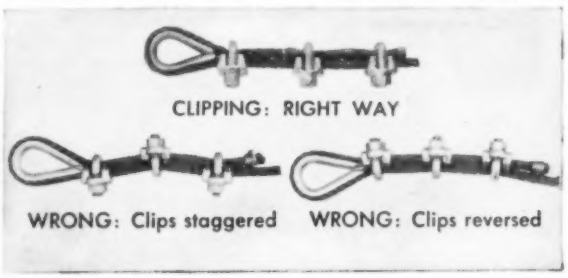
6. Place a temporary tie wire over the ends of the cleaned wire (see Fig. 3). Be careful not to get the cleaned wires greasy or oily.

7. Insert the rope end into bottom of socket. Remove temporary tie wire.

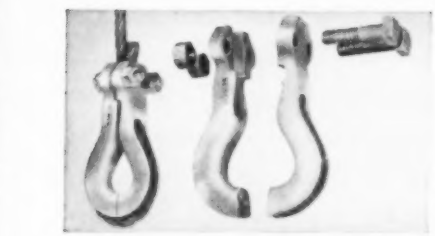
8. Holding the rope vertically in a vise, set the socket so that the wires are flush with top of the socket basket and seal the bottom with putty or clay (Fig. 4). Pour in among the wires about ½ teaspoon of sal ammoniac crystals.

9. Pour molten zinc into the basket to fill (Fig. 5). When zinc is solidified, remove seal. Socketing is complete as shown in Fig. 6.

58-3



Tips

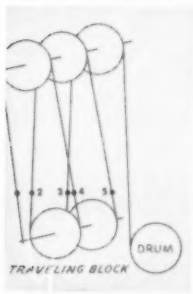


Be sure to use right FITTINGS

The fitting you use on wire rope can handicap it or enable it to work at full efficiency. Fittings which derive holding power from crimping action are harmful to the rope.

Shown here is a clamp that has no wrong side—can be put on either way. It snugly saddles the rope, grips larger surface area in such a way that loads are carried almost solely by friction rather than by crimping action. Combined in its two parts is a thimble and the parts are interlocking to prevent collapse of the thimble and to eliminate all shear on the bolts.

How to figure REEVING loads



Reeving ropes through the sheaves multiplies the number of parts supporting the load. The lead line to the drum carries the weight of the load lifted, divided by the number of parts of line supporting load, plus the accumulation of friction on all sheaves.

Here's how to count the number of parts supporting the load. Draw an imaginary line across the parts of the rope supporting the load.

The efficiency of reeving systems ranging from one to eight parts is shown in charts which Union Wire Rope engineers make available to users.

Your Tuffy distributor will help you with any wire rope problem

If you aren't acquainted with him, look under "Wire Rope" or "Slings" in the classified pages of your telephone directory. And ask him to put you on the mailing list for free "Rope Dope" educational bulletins. They're packed with boiled-down, useful information on the selection and care of wire rope for greatest service.

Extra Strength Alone Is Not Enough . . . Wire Rope Must Be BALANCED

Union Wire Rope Corporation has been making extra high strength rope for years for such uses as chokers in the logging industry, coke breakers in refineries and other purposes where it is a factor that overrides other rope characteristics.

But strength alone is not always the answer to the question of the proper rope to use. Extra high strength does not increase flexibility, resistance to crushing, abrasion or fatigue. It does not overcome the internal nicking and galling which occurs as the oil film breaks down from excessive pressures. It does not compensate for the core crushing which accompanies excessive loading. Extra high strength, in short, is not the only factor in proper design and use of wire rope.

Union Wire Rope combines such qualities as strength, flexibility and toughness in the properly balanced relationship to assure most efficient service and longest life in the operation for which the particular rope is designed. In most applications, extra high strength can add little to rope service if it throws other rope factors out of balance.

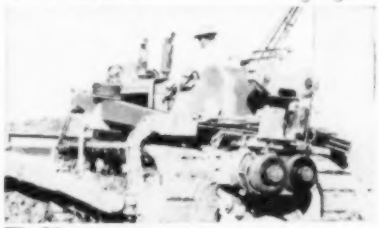
Tuffy BALANCED Special Purpose Wire Ropes

Tuffy BALANCED Slings & Hoist Lines

Top-performing team in every type of materials handling. Tuffy Slings are made of a patented, machine-braided fabric; stays extra flexible, can't be seriously hurt by knotting or kinking. Tuffy Hoist Line is a special construction of super flexibility and toughness.

Tuffy BALANCED Scraper Rope

It's flexible enough to withstand sharp bends, yet stiff enough to resist looping and kinking when slack. Moves more yardage per foot because it's specially built and balanced to take the beating of drum-crushing abuse.



Tuffy BALANCED Dozer Rope

Built to give you longer service with less downtime. 150' reels of 1/2" or 9/16" mounted on your dozers allow you to cut off worn sections without wasting good rope. Put Tuffy Dozer Rope on the job and watch costs go down!

Tuffy BALANCED Dragline Rope

Made to give you maximum abrasive resistance with super flexibility. Rides smoothly on grooves; hugs the drum when casting for full load. Consistently dependable in handling any material — wet or dry dirt, sand, gravel, rock, cement or minerals.

union Wire Rope corp.

SUBSIDIARY ARMCO STEEL CORPORATION

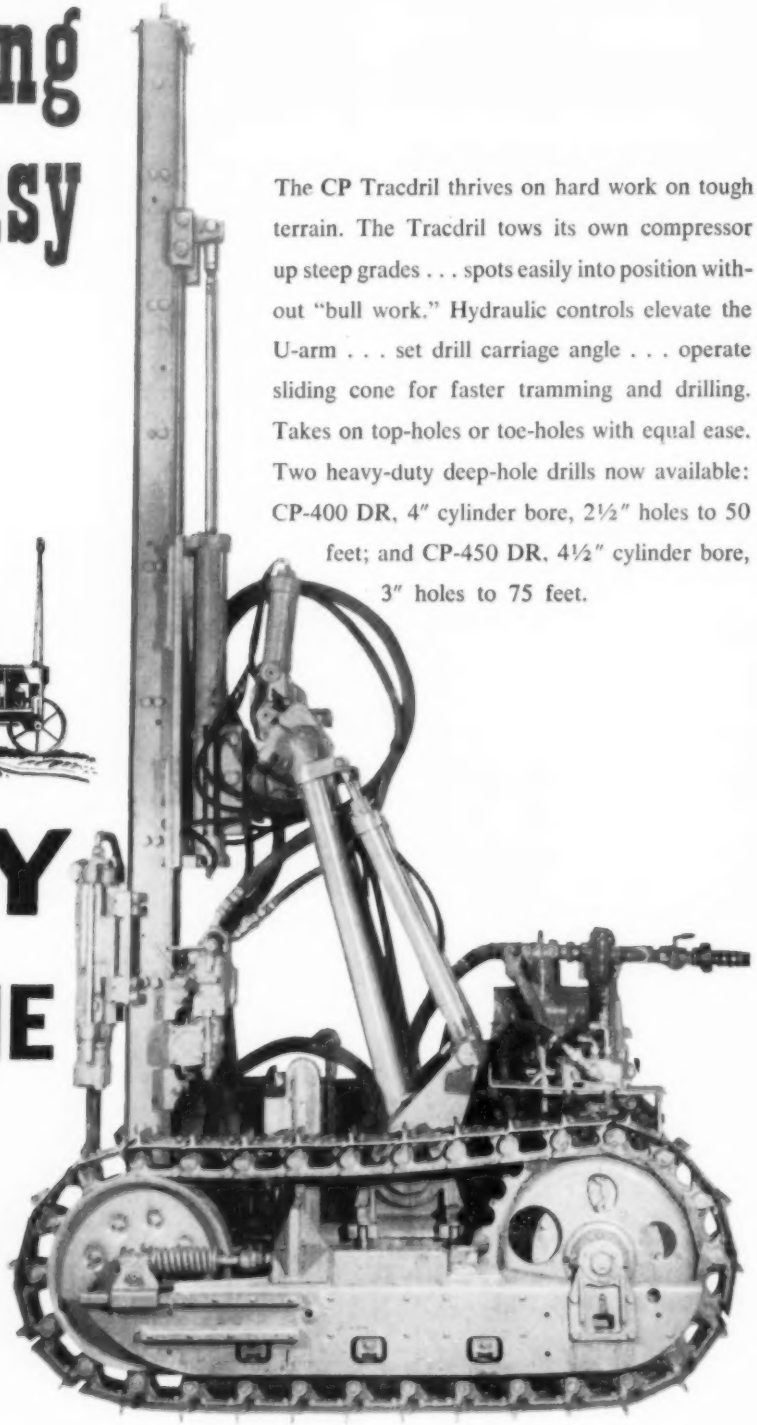
2132 Manchester Ave. **Kansas City 26, Mo.**

Specialists in high carbon wire, wire rope, braided wire fabric, stress relieved wire and strand.

1935...wagon drills made hole drilling easy

The CP Tracdril thrives on hard work on tough terrain. The Tracdril tows its own compressor up steep grades . . . spots easily into position without "bull work." Hydraulic controls elevate the U-arm . . . set drill carriage angle . . . operate sliding cone for faster tramming and drilling. Takes on top-holes or toe-holes with equal ease. Two heavy-duty deep-hole drills now available: CP-400 DR, 4″ cylinder bore, 2½″ holes to 50 feet; and CP-450 DR, 4½″ cylinder bore, 3″ holes to 75 feet.

TODAY IT'S THE CP TRACDRIL



Chicago Pneumatic 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

News of the Industry

Multimillion-Dollar Plant Being Built in Georgia For Bestwall Gypsum Co.

Bestwall Gypsum Company, Ardmore, Pa., has begun construction of a multimillion-dollar gypsum board, lath, and plaster plant at Brunswick, Ga.

Scheduled to go into operation late in 1959, the plant will use about 300,000 tons of gypsum ore annually and will be capable of producing 300,000,000 sq. ft. of gypsum board and lath products a year.

Harold Zelms, presently plant manager of Bestwall's plant in Acme, Tex., will supervise the construction program at Brunswick and will take over the management of the plant upon completion.

Sales from the new plant will be handled by Bestwall Certain-teed Sales Corporation.

Basic, Inc., Lime Operation Moved to Gibsonburg, Ohio

Basic, Inc., Cleveland, Ohio, has closed its lime plant in Clay Center, Ohio, and transferred the manufacture of lime products made there to Gibsonburg, Ohio, where a $400,000 expansion program will be completed soon.

The rotary kilns at the Clay Center plant will be maintained as surplus dead-burned dolomite facilities to meet any requirements beyond the capacities of Basic's 11 other kilns in Ohio.

Depletion Rate Changed In U.S. Gypsum Co. Case

In the case of *U. S. Gypsum Company vs. U. S. Government*, the U. S. Court of Appeals, 7th Circuit, held that gypsum is "stone" and is entitled to a 5 percent depletion rate under the Internal Revenue Code of 1939.

Previous to this decision, it was believed that gypsum fell under the category of "all other minerals" and was entitled to a 15 percent depletion rate. The recent decision was made on April 10, 1958.

U. S. Lime Products Corp. Opens $2,000,000 Plant

United States Lime Products Corporation, a subsidiary of the Flintkote Company, recently opened a new $2,000,000 lime calcining plant in Las Vegas, Nev.

Opening ceremonies, including a tour of the plant facilities and a luncheon, were attended by state and local officials and county representatives.

The official dates of the Expanded Clay and Shale Association's mid-year meeting are July 20-22, 1958. The meeting site remains the Cosmopolitan Hotel, Denver.

$5,000 Research Grant Given Lafayette College By Alpha Portland Cement

Alpha Portland Cement Company, Easton, Pa., has granted Lafayette College, Easton, an additional $5,000 for masonry cement research, bringing the amount of the company's masonry cement research donations to $10,000.

Last year the firm presented the first $5,000 grant to Lafayette. The work is sponsored by Alpha's director of technical services, Arthur T. Hersey, and is being carried out by William Zemaitis. The additional grant will permit the continuation of mortar cement research and will allow for field testing.

Original research results showed conclusively that durability is the prime factor in field mortars. These findings were reported earlier this year to a Symposium on Mortars held by the American Society for Testing Materials in St. Louis, Mo.

Coming Events

July 20-22, 1958—Denver. Mid-year meeting, Expanded Clay and Shale Association. Cosmopolitan Hotel.

July 24-25, 1958—Hot Springs, Va. Directors meeting, National Crushed Stone Association. The Homestead.

September 22-25, 1958 — San Francisco. American Mining Congress, 1958 Mining Show; Metal Mining—Industrial Minerals. Civic Center Exhibit Hall and Civic Auditorium.

September 30-October 1-2, 1958 —Las Vegas, Nev. Semi-annual meetings, boards of directors of National Sand and Gravel Association and National Ready Mixed Concrete Association. Hotel Tropicana.

October 9-11, 1958—Cleveland, Ohio. Fall operating meeting, National Lime Association. Hotel Cleveland.

October 21-22, 1958—Washington, D.C. 4th annual meeting, National Slag Association. Mayflower Hotel.

Prominent California Firm Makes Major Contribution To Outstanding Students

Southern Pacific Milling Co., Ventura, Calif., a major producer of sand and gravel, ready-mix concrete, and asphalt paving materials in the central coast area of that state, is also the sponsor of another major effort—a long-range investment in American youth.

Two outstanding high school students from the tri-county area around Ventura are the recent recipients of $1,000 college scholarships set up by the firm. The scholarships provide funds for tuition or living expenses at the colleges of the recipients' choice while they are studying toward a civil engineering degree.

Applications for the scholarships were invited from all high schools in Ventura, Santa Barbara, and San Luis Obispo counties, and the winners were selected on the basis of scholastic ability, aptitude and interest in civil engineering, personality, financial need, and character.

Gypsum and Plaster Standards Compiled in New A.S.T.M. Book

The first edition of *ASTM Standards for Gypsum Products, Plaster Aggregates, and Related Standards* has been published by the American Society for Testing Materials, Philadelphia, Pa.

Among the general topics covered in the 148-page volume are gypsum wallboard, plaster aggregates, and related materials. In all, there are 29 standards in this publication. The compilation of A.S.T.M. definitions, specifications, and test methods was prepared by A.S.T.M. Committee C-11 on gypsum.

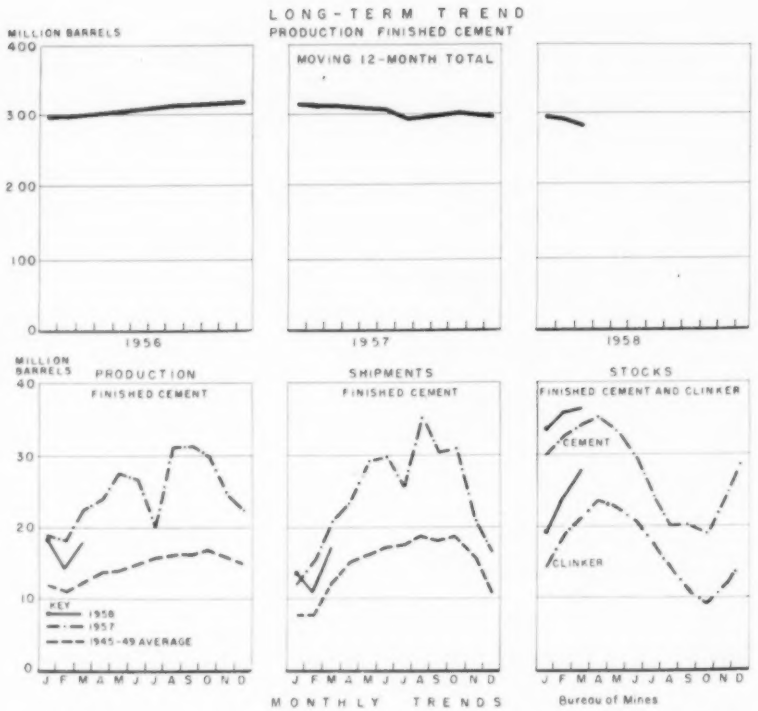
Copies may be obtained from A.S.T.M. headquarters, 1916 Race Street, Philadelphia 3, Pa., at $2.50 each.

Mill Creek Stone & Gravel Under New Management

Mill Creek Stone and Gravel Corporation, located near Richvalley, Ind., was recently purchased by five Marion and Grant County, Ind., men. Products are crushed aggregate and agricultural lime.

Ralph and Thomas Marcucilli, S. G. Wright, Bernard Winkles, and Ralph Robinson have acquired the company, which will begin operations soon. Since 1957, the men have purchased three plants, the Winkles Sand and Gravel Company, the H. and W. Sand and Gravel Co., and the Mill Creek plant.

A new $200,000 stone crusher has been added to the Mill Creek plant equipment. This unit will handle approximately 250 tons per hour. The bins at the end of the conveyor will hold approximately 100 tons. Office buildings will be erected on the site.



SUMMARY—Production of finished portland cement in March, 1958, as reported to the U. S. Bureau of Mines, totaled 17,856,000 barrels, a decrease of 21 percent from March, 1957. Mill shipments in March, 1958, totaled 17,370,000 barrels, a decrease of 15 percent, compared with March, 1957. Stocks of 36,668,000 barrels of finished portland cement on hand March 31, 1958, were 7 percent more than those on hand March 31, 1957. Clinker production during March, 1958, totaled 21,816,000 barrels, a decrease of 15 percent from the March, 1957, figure.

PRODUCTION—One hundred and fifty (150) plants (excluding 14 inactive plants) in 37 states and Puerto Rico reported a production of 17,856,000 barrels of finished portland cement during March, 1958, compared with 22,642,000 barrels produced in March, 1957.

Production of clinker during the month of March, 1958, was 21,816,000 barrels, compared with 25,617,000 barrels during the same month last year.

High-early-strength portland cement in March, 1958, totaled 836,000 barrels, a 28 percent decrease from the March, 1957, production.

Prepared masonry cement production in March, 1958—1,128,000 barrels—increased 6 per cent over the March, 1957, production.

SHIPMENTS—Mill shipments of finished portland cement for March, 1958, totaled 17,370,000 barrels, compared to 20,551,000 barrels in March, 1957.

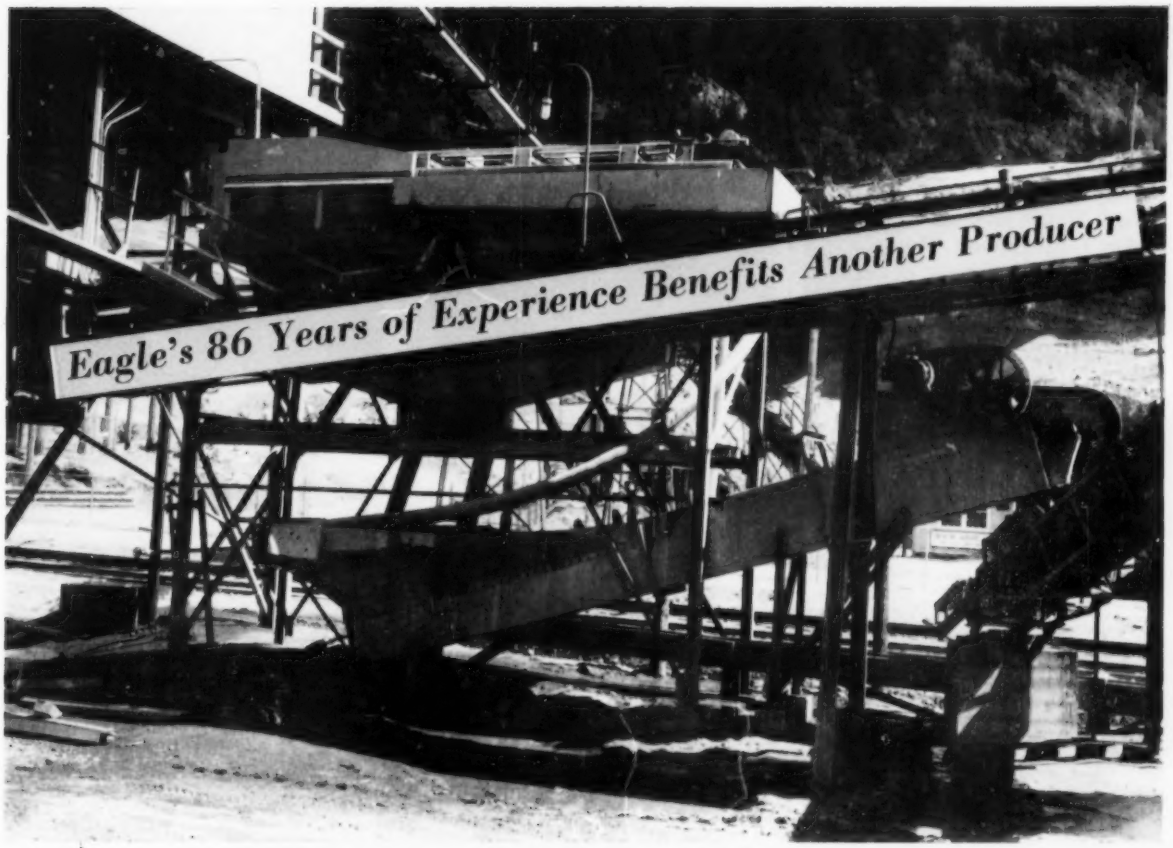
In March, 1958, shipments were higher in seven (7) districts and lower in sixteen (16) districts than in March, 1957. The greatest increase was in the Oregon-Washington district. The greatest decreases were in the eastern Pennsylvania-Maryland and the New York-Maine districts.

Mill shipments of high-early-strength portland cement totaled 911,000 barrels in March, 1958, a 15 percent decrease from the 1,067,000 barrels shipped in March, 1957.

Mill shipments of prepared masonry cement in March, 1958, totaled 1,061,000 barrels, a decrease of 1 percent from the 1,076,000 barrels shipped in March, 1957. Over half of these shipments were from mills in the northern states east of the Mississippi River. Prepared masonry cements are shown in 376-lb. barrels, although they are sold in barrels of varying weights.

STOCKS—Mill stocks of 36,668,000 barrels of finished portland cement were on hand March 31, 1958, an increase of 7 percent over the 34,277,000 barrels on hand March 31, 1957. Stocks of clinker increased 30 percent from 21,621,000 barrels on March 31, 1957, to 28,198,000 barrels on hand on March 31, 1958.

FIRST THREE MONTHS—For the January-March period the volume of production of finished cement amounted to 50,488,000 bbl., compared with 59,789,000 bbl. in the same period of 1957. Total shipment for the first three months of 1958 totalled 41,932,000 bbl. In 1957 shipments for the January-March period amounted to 47,459,000 bbl.



"EVERYTHING WORKING AS PLANNED"

Says Harry Stirland, Engineer, Construction Aggregates Ltd., New Westminster, B. C.

CONSTRUCTION AGGREGATES LTD. plant at Britannia Beach, near Vancouver, British Columbia, is a long way from Eagle Iron Works, Des Moines, Iowa. However, an Eagle Fine Aggregate Washing-Classifying-Dehydrating Section for their sand and gravel plant was shipped to them some months ago, was set up by them and is working like a charm. An Eagle field engineer visited the plant recently to check on its performance and was told "Everything is working as planned."

Eagle Engineers appraise a producer's problem, intelligently recommend the needed equipment. Eagle Iron workers make sure that the equipment will fit together and work satisfactorily when it gets to the job.

Construction Aggregates Ltd. is producing concrete sand to specifications with their Eagle equipment

which is designed so that the plant can be readily expanded later to add more washers for production of other gradations of sand.

SINCE 1872
EIW
EAGLE IRON WORKS

Send for 48-Page Catalog 58

EAGLE IRON WORKS

ENGINEERS AND MANUFACTURERS

133 HOLCOMB AVE., DES MOINES, IOWA

Factory Trained Distributors EVERYWHERE!

High April Contract Totals Called Encouraging Trend By F. W. Dodge Analysts

Construction contracts in the United States showed a "highly encouraging" increase in April, according to complete figures for the United States released by F. W. Dodge Corporation. This marked the first break in a series of declines which began last November. Virtually all categories showed improvement.

The April contract total for the United States was $2,881,011,000, an increase of four percent over April of last year. The first three months of 1958 had been down 11 percent below the same period of 1957.

The residential building category showed its first increase of the year in April. The dollar total of $1,240,217,000 amounted to a rise of 1.0 percent, and the number of dwelling units covered by the contracts was up 4 percent.

The Dodge figures indicated that April contracts for non-residential building in April totalled $957,796,000, up 14 percent from the year-ago level. This was also the first percentage increase of the year in non-residential building.

Heavy engineering contracts, totalling $682,998,000, in April, were down three percent below April of last year. In this group, public works contracts were up 22 percent, but public utilities were down 48 percent. Dr. Smith noted that the latter decline was largely accounted for by the fact that two extremely large electric utility contracts amounting to $109,000,000 brought the April total last year up to an unusually high level.

The cumulative total of contracts for the first four months of 1958 amounted to $9,594,356,000, down 7 percent from the like 1957 period. Cumulative total of contracts in the major construction categories showed: non-residential at $3,418,863,000, down 7 percent; residential at $3,806,279,000, down 6 percent; and heavy engineering at $2,369,214,000, down 10 percent.

Allis-Chalmers Pilot Plant For Grate-Kiln System Being Built Near Milwaukee

Construction plans for a new prototype model of its grate-kiln system for agglomerating and heat-treating metallic and nonmetallic minerals and concentrates has been announced by Allis-Chalmers Manufacturing Company.

This new facility, costing over $250,000, will be constructed at the company's Carrollville property, south of Milwaukee, Wis.

The grate-kiln system has already proved commercially advantageous for burning cement clinker. It shows tremendous possibilities for agglomerating various iron ore concentrates and fines to prepare them for blast furnace or open hearth feed, and also for preparing phosphate rock pellets for electric furnace feed.

The new pilot plant will have improved, larger grate-kiln equipment to provide the increased flexibility needed to carry on the extensive development work planned.

Feeding and pelletizing facilities will be improved over previous test models. In addition, there will be a larger traveling grate section of commercial design, 13 ft. long and 22 in. wide; a rotary kiln of larger capacity, 42 in. in diameter and about 18 ft. long; and a newly designed circular cooler with increased flexibility and operating advantage.

National Lime Association To Meet Oct. 9-11 in Cleveland

The 1958 National Lime Association's fall operating meeting will be held at the Hotel Cleveland, Cleveland, Ohio, on October 9-11.

Committee members planning the program include R. E. Gill, National Gypsum Company, chairman; Max Muller, Basic, Inc., program chairman; C. C. Adams, Marblehead Lime Company; and Clarence Stielstra, Dow Chemical Company.

The Perry Sand and Gravel Company has begun operations at a new location in Perry, Iowa. The new plant consolidated the facilities formerly located in Adel, Iowa, and at another site in Perry. Capacity is 200 to 300 tons of washed sand and gravel per day.

Cape AnAlloy DROP BALL

SONIC TESTED • FIELD TESTED

FORGED* (NOT A CASTING)

Leading quarry operators acclaim the superior performance of the new "Cape Ann" heat treated alloy steel drop ball.

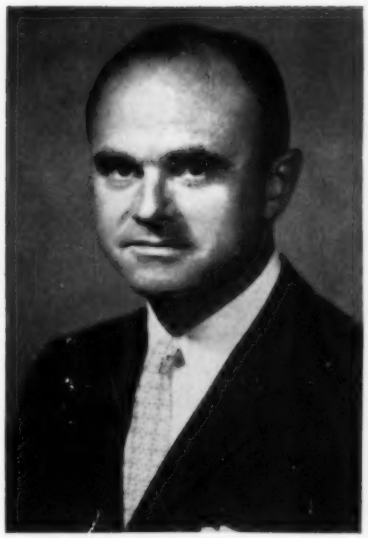
Made of long-wearing "Cape AnAlloy"*, this unit gives unequalled service and economy under all working conditions.

Write for complete details

CAPE ANN ANCHOR & FORGE CO.
P.O. Box 360 • Gloucester, Mass.

Enter 26 on card, page 211

Louis Ware



Thomas M. Ware

T. M. Ware to Succeed Louis Ware as President Of Internatl. Min. & Chem.

Thomas M. Ware has been elected president of International Minerals & Chemical Corporation, Chicago, Ill., becoming the fifth and youngest president of the 50-year-old corporation. He is 39 years old. He succeeds his father, Louis Ware, who was elected chairman of the board and chief executive officer.

Mr. Ware joined the company in 1947 as an industrial engineer. In the following five years he directed construction of new plant facilities and installations as chief engineer. Later, as vice-president of engineering, he planned and directed a program that streamlined methods in the firm's 72 mines and plants.

In 1955 he became administrative vice-president and in 1957 was named to the board of directors. He has had the additional duties of executive vice-president since the retirement of James P. Margeson in June, 1957.

April Construction Activity Gains Slightly Over April, '57

New construction activity rose seasonally in April to $3,700,000,000, according to preliminary estimates prepared jointly by the U. S. Departments of Labor and Commerce. The total dollar volume for the first four months of 1958, at $13,400,000,000, was up slightly from the comparable 1957 period, but physical volume of work put in place probably did not increase.

The latest estimates reflect a 5 percent rise in public construction from the first four months of 1957, due primarily to increased spending this year for public housing (mostly Capehart projects for the armed services) and highways. Private construction outlays thus far in 1958 totaled the same as a year ago—$9,600,000,000. Expenditures for residential building remained unchanged, and accounted for nearly half the private total in both 1957 and 1958.

These monthly estimates are determined primarily by past contract award movements, standard progress patterns, and assumed normal seasonal movements. They do not reflect the effects of varying numbers of working days in different months, nor of special conditions influencing the volume of activity in any given month, such as unusual weather, materials shortages, overtime, work stoppages, and delays.

Gerald J. Underwood has been elected president and a director of Underwood Sand and Gravel Company, Utica, Mich., to fill the vacancy caused by the death of his father, Percy O. Underwood.

WHO NEEDS TOOLS!

A HAMMER
IS ALL YOU NEED WITH
CRESCENT
BELT FASTENERS
TO JOIN OR REPAIR
CONVEYOR BELTS
OF ANY WIDTH OR THICKNESS

THE STRONGEST, SIMPLEST AND FASTEST METHOD OF BELT JOINING AND REPAIRING
NO CLIPS, NUTS OR BOLTS
NO GAP, NO PLAY, NO MOVING PARTS
NO TOOLS NEEDED

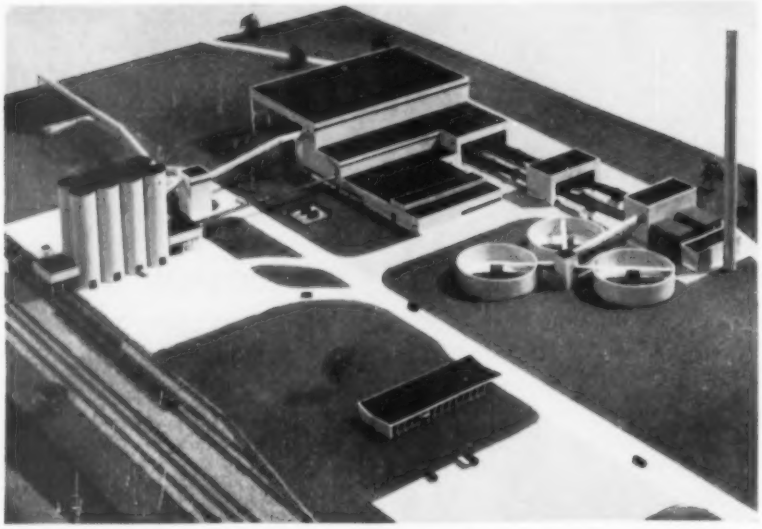
A 40" BELT JOINED WITH CRESCENT PLATES and RIVETS AFTER 18 MONTHS AT 300 TONS PER HOUR IN LIMESTONE QUARRY

FOR ESPECIALLY ABRASIVE CONDITIONS
CRESCENT
COUNTERSUNK PLATES

ATTACHED WITH CRESCENT COUNTERSUNK RIVETS
REDUCE WEAR TO A MINIMUM
At your distributors or from

CRESCENT
BELT FASTENER CO.
381 Fourth Ave. New York 16

Enter 27 on card, page 211



This model of the Dundee Cement Company's plant shows the layout of the $25,000,000 facility, which is expected to produce 5,000,000 bbl. of cement annually.

Dundee Cement Company Building $25,000,000 Plant At Michigan Location

The Dundee Cement Company announces that construction has begun on a new cement plant in Dundee, Mich., 40 miles southwest of Detroit. The annual productive capacity of the plant is 5,000,000 bbl. of portland cement. Work was started in the middle of June, and the plant is expected to be in full operation on January 1, 1960. The total cost is estimated at $25,000,000.

Raw materials are limestone and clay, both of which are available at the plant site. It is reported that reserves of raw material are sufficient for 140 years of operation.

The plant will have two rotary kilns measuring 16½ by 15 by 16½ ft. in diameter and 460 ft. in length. Each of these units is expected to produce 8,000 bbl. of clinker per day. There will be five 12- by 36-ft. grinding mills, driven by a 2,500-hp. motor. Two of these mills will work in series for the raw grinding, and three in closed circuit for the finish grinding.

Other features are an overhead crane with a 150-ft. span and cement silos 38 ft. in diameter and 150 ft. high. All equipment for this plant will be bought in the United States.

The engineering department of the St. Lawrence Cement Company is responsible for the design and the construction of the plant in co-operation with local consulting engineers.

ASTM Announces Publication Of Proceedings for 1957

The American Society for Testing Materials recently announced publication of the 1957 ASTM *Proceedings*, Volume 57. Included in the 1430-page volume is a record of the year's technical accomplishments, together with reports, papers, and discussion given before the Society during the year.

There is also a summary of the proceedings of ASTM's 60th annual meeting and that of the Philadelphia Spring meeting, listing by title and author the programs for each session.

Copies of the publication may be obtained for $12 each from the American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa.

For the 12 months ended March 31, 1958, American Cement Corporation, Los Angeles, Calif., reported net earnings of $7,870,706, equal to $1.83 a common share, compared with $9,226,008, or $2.16 per share, for the previous year. Sales for the 12-month period dipped to $53,522,589 from $58,003,375.

Permanente Cement Co. Offers to Purchase Stock Of Olympic Portland

Permanente Cement Company has made a firm offer to purchase all of the stock of Olympic Portland Cement Company Limited, according to a recent announcement released by Wallace A. Marsh, Permanente's vice-president and general manager. Olympic, an English company, is the owner of a 1,750,000-bbl. plant at Bellingham, Wash., and cement storage facilities in Seattle.

The purchase, Mr. Marsh has stated, is contingent only upon acceptance by the holders of at least 90 percent of the outstanding stock.

Permanente has marketed cement in the Pacific Northwest for the last 12 years, but has not owned a cement producing plant in that area since 1949. The company has shipped cement into Oregon, Washington, British Columbia, and Alaska from its plant in the San Francisco Bay area.

The acquisition of Olympic will enable Permanente to produce cement in the Pacific Northwest, and will also substantially increase the amount of cement available to northern California and western Nevada.

Permante has a sales division in Seattle and cement produced at the Olympic plant would, for the present, be sold under the Olympic brand.

American Aggregates Corporation, Greenville, Ohio, has purchased the Vanatta Gravel Company, Newark, Ohio, a subsidiary of the Newark Asphalt Paving Company. The new owners will retain all the Vanatta personnel and will continue to furnish aggregates for the Newark Asphalt Company.

The Arrowhead Company, Chesterton, Ind., will begin operations soon at its new silica sand processing plant in Troy Grove, Ill. Construction began in January on facilities including five storage silos and a building for washing and drying. The firm has an estimated reserve of 50,000,000 tons of silica sand on its property.

Construction Contracts Climb in May, 1958—Highest Since Dec., 1950

Heavy construction contract awards climbed again in May, to score the fifth consecutive monthly increase.

The upsurge pushed May contract volume to the largest recorded for any month since the all-time high in December, 1950. Awards topped $2,300,000,000, second only to the $2,400,000,000 in 1950, of which half was for the Savannah River atomic energy plant. However, on a weekly average basis (the month had five contract weeks), May awards were the highest since October, 1956. Moreover, they set a new high for the month of May and scored gains of 17 percent above April, 1958, and 25 percent over May a year ago.

May's whopping contract total pushed the five month value in 1958 to $7,200,000,000, within 2 percent of last year's corresponding total. This is a much smaller 1957-1958 deficit than the 16 percent decline at the end of March or the 21 percent drop as of the end of February.

$193 Million April Contracts Let for Highway System

Construction contracts on 383 miles of the National System of Interstate and Defense Highways were awarded in April at an estimated cost of $193 million, according to the Bureau of Public Roads, U. S. Department of Commerce.

Preliminary engineering worth $8 million and right-of-way acquisition estimated to cost over $29 million were authorized during the month. A total of 50 miles of construction was completed in April at a cost of $24 million, bringing the mileage completed to more than 4,000 and the cost to more than $2 billion.

Directors of the National Gypsum Company, Buffalo, N. Y., have approved a proposal for National Gypsum to acquire the American Encaustic Tiling Company, Lansdale, Pa., through a stock exchange. This proposal will become effective if accepted by 90 percent of American Encaustic stockholders.

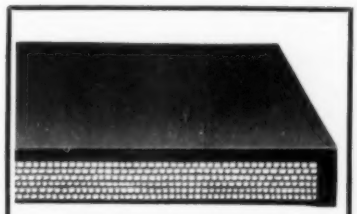
Quaker belt conveying jagged granite rock from quarry.

Here's the tough, tested belting
MADE FOR THE REALLY ROUGH JOB

Take a good look at that picture. Rough, ragged, razor-sharp rock like that can take a terrific toll in conveyor belting. Or it could before Quaker came along with conveyor belting that's *tough enough to take it!*

Quaker Conveyor Belting is especially designed for the rough ones—jagged loads of ore, gravel, brick that would tear most belting to shreds in short order. There's a special Quaker belting for every special need, with flexibilities, degrees of puncture-resistance and tensile strength for the toughest quarry requirements. Even covers and internal-ply designs can be modified as your needs dictate.

Your Quaker industrial distributor can give you the details on Quaker Conveyor Belting, and assistance on *all* problems involving industrial rubber products. Call him.



Cross-section Quaker No. 1 grade conveyor belt. For toughest handling problems of almost every conveyor job. Mildew-inhibited. Available in duck, rayon duck, and cotton-nylon ducks. In all lengths, with any number of plies. In widths up to 72".

FREE CATALOG. Send for this illustrated Quaker Conveyor Belting Catalog. Write QUAKER RUBBER DIVISION, H. K. PORTER COMPANY, INC., Philadelphia 24, Pa., or Pittsburg, California.

H. K. PORTER COMPANY, INC.

QUAKER RUBBER DIVISION

Enter 29 on card, page 211

Canadian Cement Output Dips in 4-Month Period—April Total Higher

Canadian manufacturers of portland cement shipped or used 413,320 tons of cement in April, 1958, compared with 310,877 tons in the previous month. In 1957, the April shipments amounted to 379,383 tons. Actual production for April, 1958, was 453,381 tons, compared with 413,928 tons in the corresponding month of 1957.

Stocks at plants and warehouses at the beginning of April, 1958, totaled 763,989 short tons as compared with 747,233 tons at the beginning of April, 1957.

Production for the period of January to April, 1958, amounted to 1,475,958 short tons while in the same period of 1957, the total was 1,571,583 tons.

Shipments to customers and used at plants for the 5-month period in 1958 reached a total of 1,125,519 short tons. In the same period of 1957, the figure was 1,075,323 short tons.

N.B.C.A. to Meet February 2-6 In Miami Beach, Florida

The 1959 convention of the National Bituminous Concrete Association will be held February 2 to 6 at the Americana Hotel in Miami Beach, Fla., according to an announcement by John W. Kelley, president of the association.

This will be the fourth convention of the group, which is composed of asphalt paving contractors in the United States as well as in foreign countries.

National Lime Assn. Film Features Lime Stabilization

A modern, low-cost method of road base construction is presented in a new 16-mm. sound-color movie entitled *Lime Stabilization of Roads*, which was produced by the National Lime Association. This 23-minute educational film shows the use of lime used in stabilizing marginal caley soils on projects ranging from interstate freeways to farm-to-market roads, and including city streets, airfields, and shoulders. Typical construction procedures for both subgrade and base courses are shown.

The movie also demonstrates graphically and by actual field examples how lime changes soil characteristics, such as lowering of p.i. and shrinkage, increasing strength and stability, and expediting construction during wet weather.

Reservations for showing the film by interested groups may be obtained by sending a request to the National Lime Association, 925—15th Street, N. W., Washington 5, D. C. The film will be shipped express collect and must be returned at the borrower's expense. Prints may also be purchased.

Harry T. Campbell Sons' Corp. Opens $100,000 Sakrete Plant

The $100,000 modern Sakrete plant of Harry T. Campbell Sons' Corporation, Towson, Md., has begun operations in Batavia, N. Y. This plant utilizes the Sakrete swirlmix method to ensure complete uniformity of mix.

Raymond Gibbons, who had been sales representative in the upper New York area for five years, is district manager at Batavia; Harold Nadeau, who has been at the Farmington, Conn., plant for six years, is plant manager.

Men of the Industry

WHEN Oscar Edward Benson became associated with the crushed stone industry 11 years ago as assistant to the president of The General Crushed Stone Company, it was the first step along the route that was to lead to two more important and responsible positions. First, that of the presidency of General Crushed Stone—an office to which he was elected in 1951; and second, that of the presidency of the National Crushed Stone Association, a post he was chosen to fill at the February 1958, annual convention of that group.

Mr. Benson brought with him, when he entered this industry, a long background of experience in engineering and construction. This training started prior to his high school graduation in 1916 with employment as transitman and as general foreman of the mantenance-of-way department of the Pittsburgh, Shawmut & Northern Railroad Company.

Oscar E. Benson

Subsequent formal schooling in engineering led to a position with the Empire Gas & Electric Company at Geneva, N. Y. His later promotions to construction superintendent and then division operating superintendent culminated in a move to Easton, Pa., in 1942, as division manager for the Metropolitan Edison Company. He became a vice-president of that company in 1946.

Mr. Benson resigned from the latter position in June, 1947, to begin his association with General Crushed Stone, and five months later was named vice-president and general manager of the firm. His industry activities prior to becoming president of N.C.S.A. included membership on the board of directors of that group. He has also been a member of the advisory committee for the stone industry in the Office of Price Stabilization.

Affiliation with a wide range of civic and charitable organizations has included the Easton Chamber of Commerce, the local Community Chest, hospital, and Red Cross programs, plus an appointment as a national representative of the Boy Scouts of America.

Flintkote Co. Announces Opening of Indiana Plant For Insulrock Production

A new Insulrock producing plant was opened recently by Flintkote Company at North Judson, Ind., to meet the needs for that product of the Mid-Western and Chicago areas.

The plant will have an annual capacity of 60,000 tons when in full production and will employ about 140 persons. Production at the North Judson location will slightly exceed that of the other two Insulrock plants in Linden, N. J., and Richmond, Va.

Situated on a 30-acre tract adjacent to tracks of the New York Central Railroad, the plant has 49,000 sq. ft. of interior floorspace with 113,000 sq. ft. of paved yard area. All machinery and equipment were designed and engineered by Flintkote.

Bruce S. Campbell to Head Harry T. Campbell Sons' Corp.

Bruce S. Campbell has been elected president and chairman of the board of Harry T. Campbell Sons' Corporation, Towson, Md.

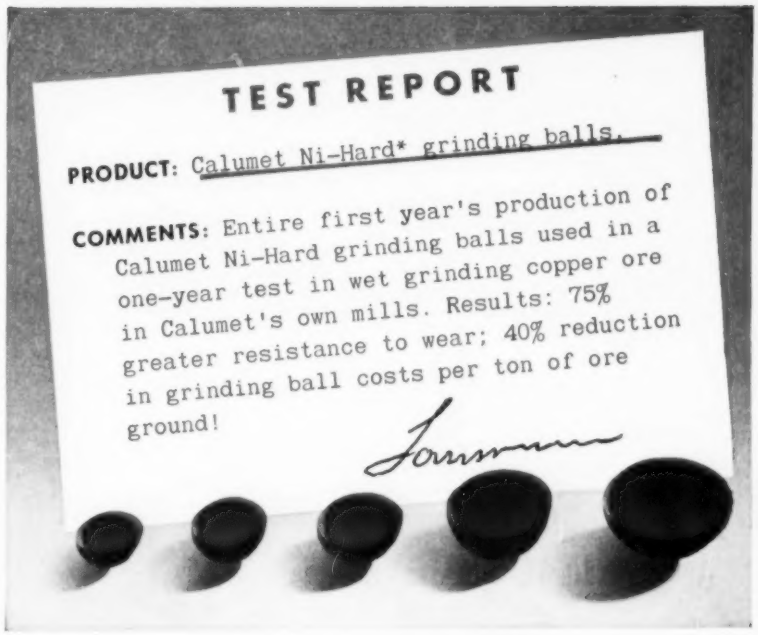
Other officers are H. Guy Campbell, vice-chairman of the board; Harry G. Campbell Jr. and Richard L. Campbell, vice-presidents; Robert F. Porter, vice-president, materials sales; Albert S. Cummins, vice-president, Sakrete Division; S. James Campbell, treasurer; and R. McLean Campbell, secretary.

Colombians Visit Company As Part of American Tour

The Marquette Cement Manufacturing Company plant at La Salle, Ill., was visited recently by William J. Stol and Emilio Rivera, engineers on the staff of the Socony-Mobil Oil Company of Bogota, Colombia.

The two visitors, who are on a three-month tour sponsored by the oil firm, are studying American management and industry.

CLARENCE A. SANBORN, 52, president of the Casey Stone Company, Casey, Ill., suffered a fatal heart attack at his home after an illness of several months.


TEST REPORT
PRODUCT: Calumet Ni-Hard* grinding balls.
COMMENTS: Entire first year's production of Calumet Ni-Hard grinding balls used in a one-year test in wet grinding copper ore in Calumet's own mills. Results: 75% greater resistance to wear; 40% reduction in grinding ball costs per ton of ore ground!

"We found CALUMET NI-HARD GRINDING BALLS so good we use them ourselves!"

You can't beat this kind of enthusiasm — or results! Calumet Division actually tested their Ni-Hard grinding balls with the results stated above. From this experience, Calumet knows exactly what a user wants in grinding ability, durability, initial cost and overall costs.

Compared with forged steel balls in dry grinding, Calumet Ni-Hard grinding balls proved to be *4 to 1 times greater in wear resistance!*

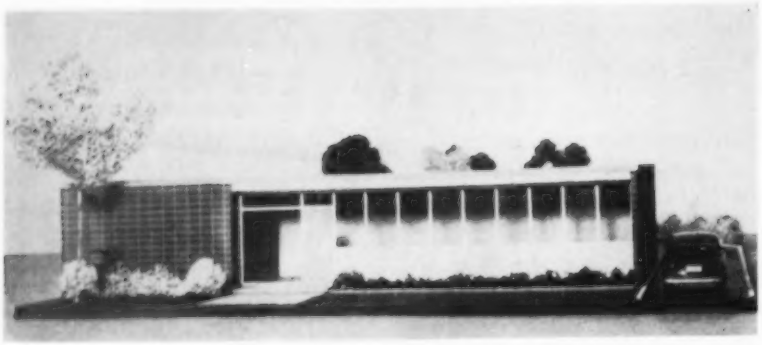
Calumet Ni-Hard grinding balls are rigidly quality controlled—laboratory tested to insure meeting Calumet's own high standards. They are available from stock in the following sizes: 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2" and 2". Try Calumet Ni-Hard grinding balls in your own mill. See for yourself how they can increase tonnage and lower costs. Write today for more information.

*Reg. U.S. Pat. Off., Intl. Nickel Co., Inc.

CALUMET & HECLA, INC.
CALUMET DIVISION
URANIUM DIVISION
GOODMAN LUMBER DIVISION
WOLVERINE TUBE DIVISION
In Canada:
CALUMET & HECLA OF CANADA LIMITED
WOLVERINE TUBE DIVISION
CANADA VULCANIZER & EQUIPMENT CO. LTD.
UNIFIN TUBE DIVISION

CALUMET DIVISION
OF CALUMET & HECLA, INC.
1 CALUMET AVENUE • CALUMET, MICHIGAN

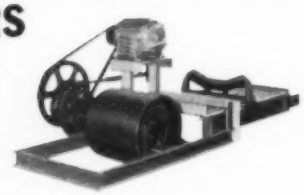
Enter 31 on card, page 211



● Architect's model of the Pacific Coast Division headquarters building of The Asphalt Institute, which is under construction in Berkeley, Calif. B. A. Vallerga, division managing engineer, will be in charge of the organization's work in Washington, Oregon, California, and Arizona.

TRANSALL® Endless-Economy BELT CONVEYORS

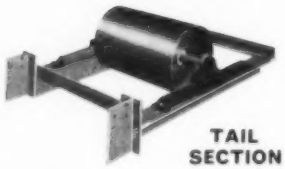
ASSEMBLE EASILY, RAPIDLY TO FIT ANY SIZE JOB



HEAD SECTION

INTERMEDIATE SECTION

NO LUBRICATION COSTS... FACTORY PRELUBRICATED FOR LIFE



TAIL SECTION

SAVE TIME AND EFFORT

At your site, assemble any length conveyor needed . . . rapidly and easily. Simply connect desired number of intermediate sections to head and tail section . . . easily lengthened, shortened or moved. Conveyor sections are available in either channel type (illustrated here) or truss type.

CUT MAINTENANCE COSTS! Factory prelubricated Transall heavy duty, **Tran-Seal** Idlers do not require re-lubrication. For free illustrated folder 915C, giving full information, write or wire TRANSALL, INC., P. O. Box 1588, Birmingham, Alabama.

TRANSLATING MORE EXPERIENCE INTO GREATER ECONOMY FOR YOU.

TRANSALL, INC. 109 No. 11th Street • P. O. Box 1588 BIRMINGHAM, ALA.

Enter 32 on card, page 211

$3,000,000 Plant Opened By Utah Marblehead Lime For Dolomite Production

Utah Marblehead Lime Company is opening a new $3,000,000 dolomite plant near Delle, Utah. Dolomite will be taken from the Lakeside Mountains near the site and processed for use in the open-hearth furnaces of western steel mills.

At present, dolomite is shipped in from Illinois at a cost of about $30 a ton. The new facility is expected to cut this cost by more than half.

Reserves of the pure dolomite in the Lakeside Mountains reportedly amount to more than 20,000,000 tons. Although it has a capacity of around 410,000 tons of raw rock a year, the plant will probably start at about half capacity.

Stevens Fire Brick Purchased By A. P. Green Fire Brick Co.

The A. P. Green Fire Brick Company, Mexico, Mo., recently acquired the Stevens Fire Brick Company, Macon, Ga., in an exchange of common stock.

Stevens produces Georgia type of super, high, and medium-duty fire brick, which differs from those produced by the Green Company in Mexico. This purchase continues the company's policy of rounding out a complete line of refractory products to meet the demands of industry in all sections of the country.

Robert McIntosh, in charge of the Dallas office of the A. P. Green Fire Brick Company of Texas, has taken over as manager of the firm acquired.

Expanded Products Division Established by Zonolite Co.

Formation of an Expanded Products Division under the direction of R. W. Sterrett, vice-president and general manager, has been announced by J. A. Kelley, president, Zonolite Company, miners and manufacturers of vermiculite insulation and lightweight aggregates.

This division of the company will be responsible for sales and production in 19 districts in which Zonolite Company operates 20 processing plants.

Lime Reduces Fallout Danger Says Agriculture Dept. Report

Conventional liming materials can help reduce fallout danger to cropland from radioactive strontium-90, it was reported recently in a bulletin from the United States Department of Agriculture. The report, entitled *Defense Against Radioactive Fallout on the Farm,* is listed as Farmers Bulletin No. 2107.

Plants growing in soils abundant in calcium absorb less of the radioactive material than those in soils deficient in calcium because calcium and strontium are chemically similar.

To reduce fallout hazards on cropland the department suggests that these measures be taken: (1) leach porous soils with water; (2) lime intensively the strongly and moderately acid soils; (3) add large amounts of decomposable organic matter; and (4) plow the surface layer of the soil deeply.

Pamphlet Offers Information On Bank Loan Procedures

Financial Statements for Bank Credit Purposes is the title of a pamphlet published recently through the co-operation of the accounting and banking professions. The booklet contains a summary of questions which bankers ask before granting business loans.

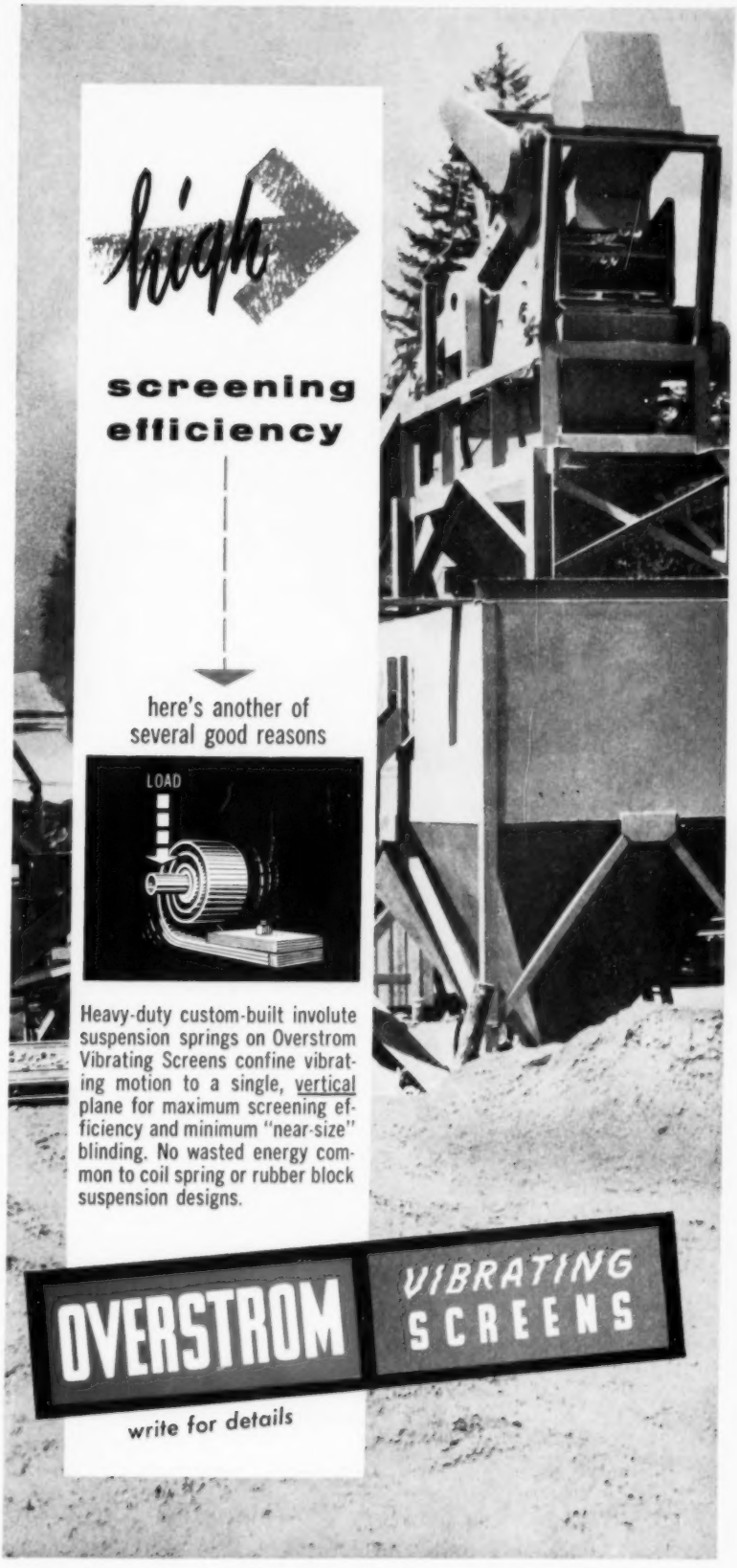
Copies may be obtained from The American Institute of Certified Public Accountants, 270 Madison Avenue, New York 16, N. Y.

Round Rock White Lime Launches Plant Expansion

Round Rock White Lime Company, Round Rock, Tex., will add two large rotary kilns, complete with preheaters and coolers, in a $750,000 plant expansion plan which will triple production.

Construction is scheduled to begin immediately. The new facilities are expected to be in operation by January 1, 1959.

Rock Hill Stone and Gravel Company has sold a part of its plant equipment in Sterling, Kans., to Ed Dill, who will operate the firm as the D. and E. Materials Company.


high
screening
efficiency
here's another of
several good reasons
LOAD
Heavy-duty custom-built involute suspension springs on Overstrom Vibrating Screens confine vibrating motion to a single, vertical plane for maximum screening efficiency and minimum "near-size" blinding. No wasted energy common to coil spring or rubber block suspension designs.
OVERSTROM
VIBRATING SCREENS
write for details

OVERSTROM & SONS, INC • 2213 WEST MISSION RD • ALHAMBRA, CALIFORNIA

Enter 33 on card, page 211

Industry Personalities

C. L. PHILLIPS, chief chemist at the Penn-Dixie Cement Corporation, Petoskey, Mich., retired on July 1, 1958, after 42 years in the cement industry.

Mr. Phillips began his career in 1916 as mix-chemist with the old Newaygo Portland Cement Company, Newaygo, Mich. When the Petoskey Portland Cement Company began operations in 1921, he joined the firm as chief chemist. He continued in that position after the Petoskey firm was purchased by Penn-Dixie in 1955.

Walter C. Laut, controller and assistant secretary, North American Cement Corp., has been elected secretary of the New York City Control of the Controllers Institute of America, a non-profit management organization of controllers and finance officers from all lines of business.

V. S. Tadsen

VIRGIL S. TADSEN has been appointed director of research and development of the Gibsonburg Lime Products Company, Gibsonburg, Ohio. In his new capacity, he will direct the research and development of new lime products and methods.

Mr. Tadsen has been in charge of quality control at the company for 17 years. Prior to joining Gibsonburg Lime, he was chemistry instructor at both Toledo (Ohio) and Heidelberg universities.

DONALD C. TRETZEL and D. G. FARQUHARSON have been elected vice-presidents of the Kaiser Bauxite Company, a wholly-owned subsidiary of Kaiser Aluminum & Chemical Corporation which operates bauxite mining, processing, and shipping facilities on Jamaica, B. W. I.

Mr. Tretzel, works manager of the company, and Mr. Farquharson, its administrative manager, have been associated with the development of Jamaican bauxite operations since 1951, when Kaiser began building facilities on the island's south coast.

R. H. Green

RAYMOND H. GREEN has been named to the newly-created post of director of personnel and public relations by the New Haven Trap Rock Company, New Haven Conn. He has been with the company since 1951 and was formerly safety engineer for all company operations throughout Connecticut.

Succeeding Mr. Green as safety engineer will be David W. Anderson, who joined the firm in 1956.

RAY M. LOHR, has been named controller of Bessemer Limestone and Cement Company, Youngstown, Ohio. He has had wide experience in public and private accounting, having been assistant controller of the Twin Coach Company, Kent, Ohio.

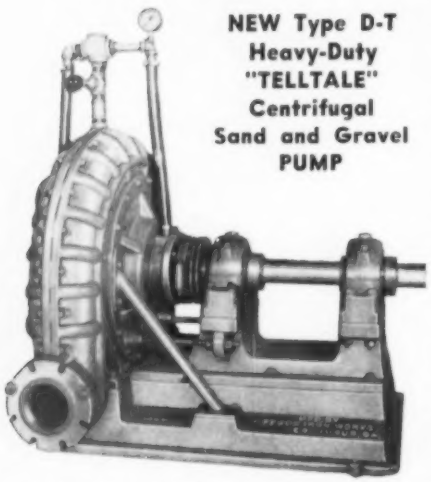
ROBERT D. STEPHAN, formerly vice-president of dealer sales, has been appointed vice-president of sales for the United States Gypsum Company, Chicago, Ill. He joined the company in 1934 and in 1953 became vice-president of dealer sales, a position he held until his recent promotion.

Three Minnesota Mining & Manufacturing Co. executives — MAYNARD H. PATTERSON, ROBERT W. MUELLER and LYLE H. FISHER — have been elected vice-presidents of the company by 3M's board of directors.

The board also elected HAROLD F. LARSON assistant treasurer of the company.

Mr. Patterson has been general manager of 3M's international divi-

A PUMP UNCHOKES ITSELF AND KEEPS ON ROLLIN' ALONG



NEW Type D-T Heavy-Duty "TELLTALE" Centrifugal Sand and Gravel PUMP

"Another thing hard to believe is that whenever a plug blocks the line we are able to put on a few more RPMs and raise the pressure enough to blow it on through — which would happen with no other pump I ever owned."

So says Wilson Brisbois, American Stone Products, 6335 Sashabaw Road, Clarkston, Mich., reporting 175 to 200 cubic yards of sand and gravel per hour produced by this 8 x 10" Type D-T Heavy Duty "Telltale" Pump.

AS LOW IN DOWNTIME AS IT IS HIGH IN PRODUCTION

The useful and exclusive telltale feature is one of all the best retained in the latest "Telltale" pump, only type we now manufacture.

Some new features: New highs in production—new lows in downtime, because of simple foolproof assembly for changing parts—also "Telltale's" own.

Available with either tough semi-steel or best-in-the-long-run Ni-Hard wearing parts in 4", 6", 8", 6 x 8" suction and 8 x 10" suction. Now available also in either alloy, 45 and 90° extra-heavy long-radius flanged elbows. Write for Type D-T Heavy-Duty folder and prices.

PEKOR IRON WORKS, INC.

LOCK DRAWER 909 — ESTABLISHED 1892 FAIRFAX 2-4020 — COLUMBUS, GEORGIA

Enter 34 on card, page 211

sion for two years. Previous to that he was general manager of 3M's Canadian subsidiary.

Mr. Mueller has been general manager of the industrial trades tape division since 1955. Prior to that he was general sales manager of 3M's coated abrasives and related products division.

Mr. Fisher has been director of personnel relations and industrial relations since 1954; and Mr. Larson has been general office manager for 3M since 1954.

New promotions for three officers and directors of Gifford-Hill & Company, Inc., have been announced.

J. R. Hill moves from the presi-

J. R. Hill Jr.

P. W. Gifford

dency of the company to the chairman of the board. P. W. GIFFORD is the new president, moving up from his former position as executive vice-president.

JOHN R. HILL JR. was named first vice-president. He was formerly chief engineer for the Gifford-Hill Companies.

The promotions, announced by Mr. Hill, apply also to the companies affiliated with Gifford-Hill: Southwest Construction Materials Company, Coastal Plains Supply Company, Dallas Concrete Company, Grand Prairie Construction Company, Trux Mix Concrete Co., and Evangeline Railway Co.

The appointment of JOHN F. MCCORMICK as plant operations manager has been announced by R. W. Sterrett, vice-president and general manager of Zonolite Company's Expanded Products Division, Chicago.

Mr. McCormick joined the firm in 1953 as plant manager in North Billerica, Mass. He later served as a production engineer and quality control supervisor.

LOUIS E. SCHNEEBERGER, assistant secretary and assistant treasurer of the Louisville Cement Company, Louisville, Ky., since 1952, is retiring after nearly 50 years of service with the firm.

Mr. Schneeberger started with the company in 1905, and has served Louisville Cement continuously, except for three years.

Two new appointments in North American Refractories Company have been announced. FRED W. SCHROEDER has been appointed director of research. He will be in charge of the company's new Research Center at Curwensville, Pa.

ROBERT A. MOFFETT has been appointed director of technical service for the company.

ROY JURGENSEN has been appointed industrial relations representative for Permanente Cement Company, Oakland, Calif., with headquarters at the Permanente (Calif.) plant. He was formerly representative for Kaiser Aluminum and Chemical Corp. at Spokane, Wash.

FRANCIS X. COURTNEY and ALLAN M. DOUGLASS have been elected vice-presidents and LESTER CROWN, now a vice-president, to the

A. M. Douglass

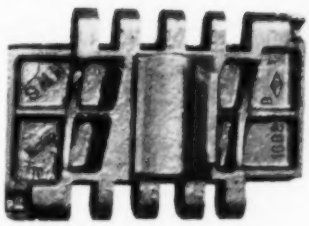
F. X. Courtney

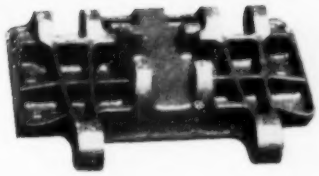
board of directors of the Material Service Corporation, Chicago, Ill.

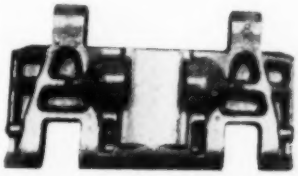
Mr. Courtney joined the firm in 1934 and became building sales manager in 1949, assistant to the sales vice-president in 1955, and assistant secretary of the corporation in 1956.

Mr. Douglass has been general sales manager of the Material Service Specialty Products Division since 1955 and assistant secretary of the corporation since 1956.

Columbia MANGANESE STEEL CRAWLER SHOVEL PADS







- LONGER SERVICE LIFE
- ALL MAKES OF SHOVELS
- INTERCHANGEABLE WITH ORIGINAL PARTS

Columbia

MANGANESE CRUSHER JAWS • ROLL SHELLS
GYRATORY PARTS • SHOVEL PADS • BUCKET TEETH

COLUMBIA STEEL CASTING CO., Inc.
933 N.W. Johnson St., Portland 9, Oregon, U.S.A.

Enter 35 on card, page 211

Obituaries

GABRIEL SCOTT BROWN, former president of the Alpha Portland Cement Company, Easton, Pa., died in Easton at the age of 87 after a long illness.

Mr. Brown had been active in the direction of the firm until 1935, when illness forced him to resign his executive post. He continued to serve as chairman of the board of directors. He also served three terms as president of the Portland Cement Association.

JOHN KELLER SR., founder of the John Keller Gravel and Concrete Products Company, Eureka, Ill., died recently at the age of 91.

HARRY A. KING, manager of the asbestos fibre sales division of The Ruberoid Company, New York, N. Y., died recently at Phelps Memorial Hospital, North Tarrytown, N. Y. at the age of 63 years. A veteran of more than 35 years in the building materials business, Mr. King had managed asbestos fibre sales for the company since 1943.

LOUIS F. FARACE, 61, chief engineer for Alpha Portland Cement Company, Easton, Pa., died of a heart attack on April 6 at his home in Allentown, Pa. He had been with the company for 40 years, becoming chief engineer seven years ago.

EDWARD N. MCDONALD, former treasurer of the Pittsburgh Sand and Supply Company, Baden, Pa., died recently in his home in Beaver, Pa.

EDWARD S. BIXLER, chairman of the board of the Limestone Products Corporation of America, Newton, N. J., died at the age of 79 at his winter home in Hollywood, Fla.

DEWEY H. BURDEN, 60, president of Owl Rock Products Company, Compton, Calif., and Service Rock Company, Riverside, Calif., died recently at his ranch home near Compton.

EDWIN S. TURNER, sales engineer for the Bessemer Limestone and Cement Company, Youngstown, Ohio, for the last 8 years, died of a heart ailment at the age of 50.

BYRON J. GREEN, manager of the Knox County Sand Company, Vincennes, Ind., and the Mitchell Crushed Stone Company quarry at Mitchell, Ind., died of injuries suffered in a dynamite explosion at the Mitchell quarry.

EDWIN S. CROSBY, retired president of the Johns-Manville International Corporation, New York, N. Y., died recently at the age of 70 in Maplewood, N. J.

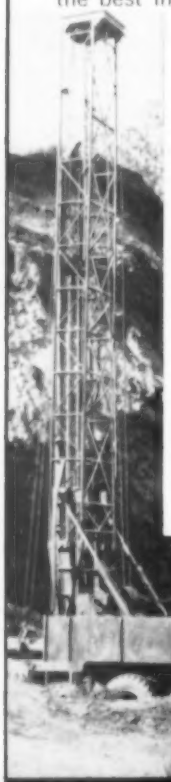
LEE PARSONS, secretary of the Oregon Portland Cement Company, Portland, Oreg., died recently in Portland at the age of 66. He had been associated with the firm for 35 years.

KEYSTONE-FRANKS ROTARY MOLE DRILLING MACHINE

Phone for a Demonstration

Telephone: Beaver Falls, Pa. 69, or Kearny, New Jersey, 2-2600

For 6 ½" blast holes, our experience indicates that we can drill them faster and at a lower cost because we have combined the best in applied drilling engineering.



- Gardner Denver AM6 Mole Dril
- Timken 6½" carbide insert bits
- International Harvester Truck
- Cummins Diesel Engine
- Gardner-Denver WBJ Compressor, 600 CFM at 100 PSI
- Keystone Franks Rotary Mole Drilling Machine

While we DEMONSTRATE what we can do, we cut your drilling costs at the same time. Phone or write us for a DEMONSTRATION on your quarry, mine, road or construction job.

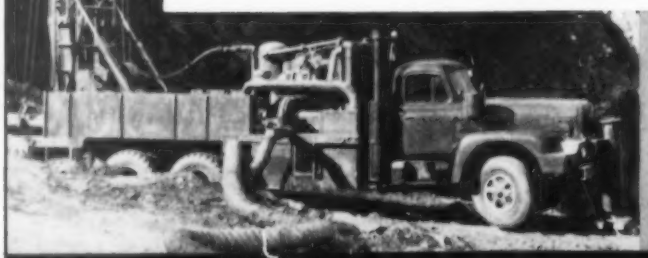
GARDNER DENVER COMPANY

MOLE DRIL

DOWN THE HOLE GUN

with

Timken threaded carbide insert rock bit



STARDRILL-KEYSTONE COMPANY

MAIN OFFICE: BEAVER FALLS, PA., TELEPHONE 69

BRANCH: KEARNY, NEW JERSEY, TELEPHONE 2-2600

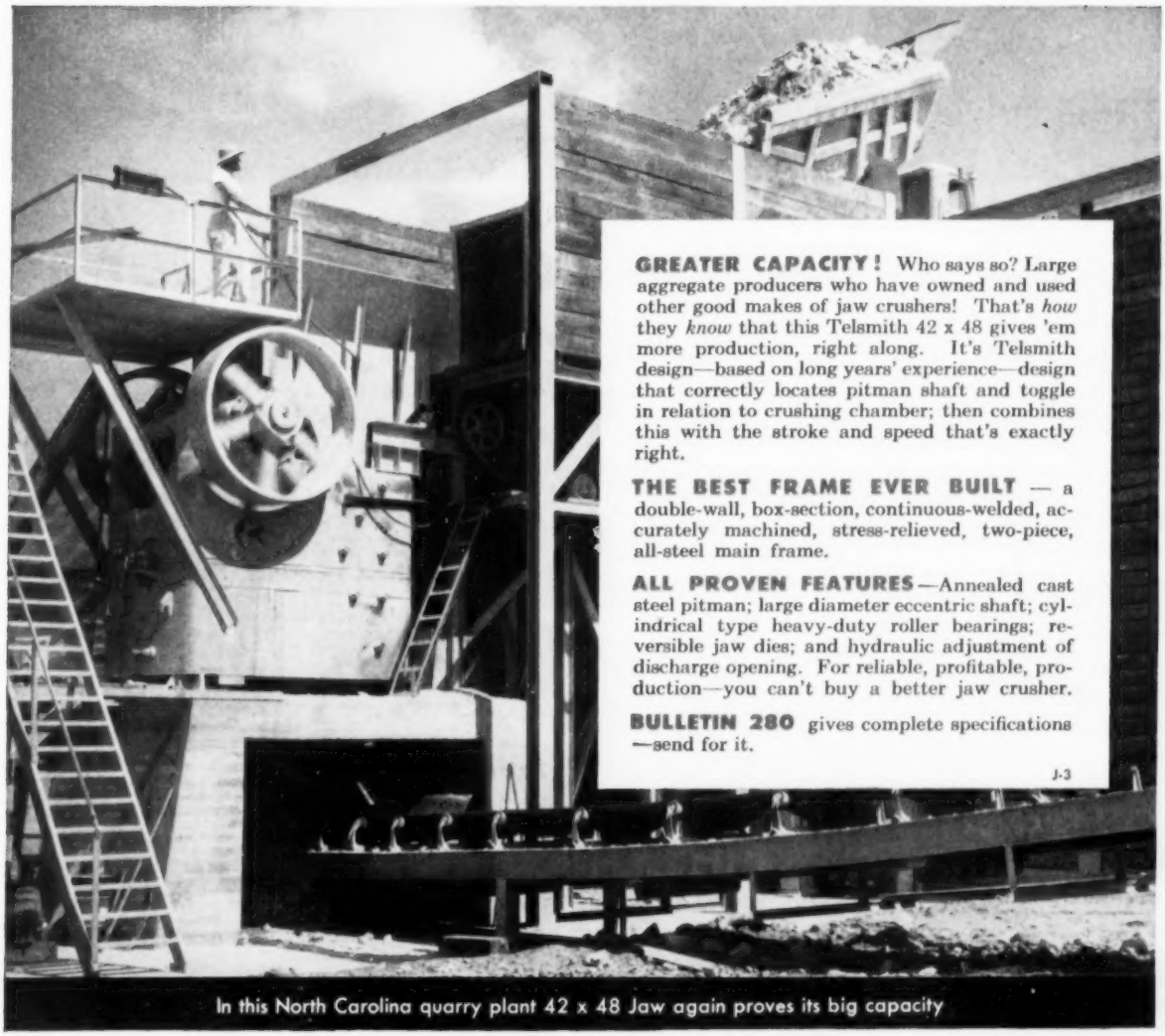
MANUFACTURERS SINCE 1882

Enter 36 on card, page 211

TELSMITH®

42" x 48" JAW CRUSHER

with welded steel frame



GREATER CAPACITY! Who says so? Large aggregate producers who have owned and used other good makes of jaw crushers! That's *how* they *know* that this Telsmith 42 x 48 gives 'em more production, right along. It's Telsmith design—based on long years' experience—design that correctly locates pitman shaft and toggle in relation to crushing chamber; then combines this with the stroke and speed that's exactly right.

THE BEST FRAME EVER BUILT — a double-wall, box-section, continuous-welded, accurately machined, stress-relieved, two-piece, all-steel main frame.

ALL PROVEN FEATURES—Annealed cast steel pitman; large diameter eccentric shaft; cylindrical type heavy-duty roller bearings; reversible jaw dies; and hydraulic adjustment of discharge opening. For reliable, profitable, production—you can't buy a better jaw crusher.

BULLETIN 280 gives complete specifications —send for it.

J-3

In this North Carolina quarry plant 42 x 48 Jaw again proves its big capacity

SMITH ENGINEERING WORKS

504 E. CAPITOL DRIVE **MILWAUKEE 1, WISCONSIN**

Representatives in Principal Cities in All Parts of the World • Cable Address: Sengworks, Milwaukee

Moving 16,000 to 20,000 tons of

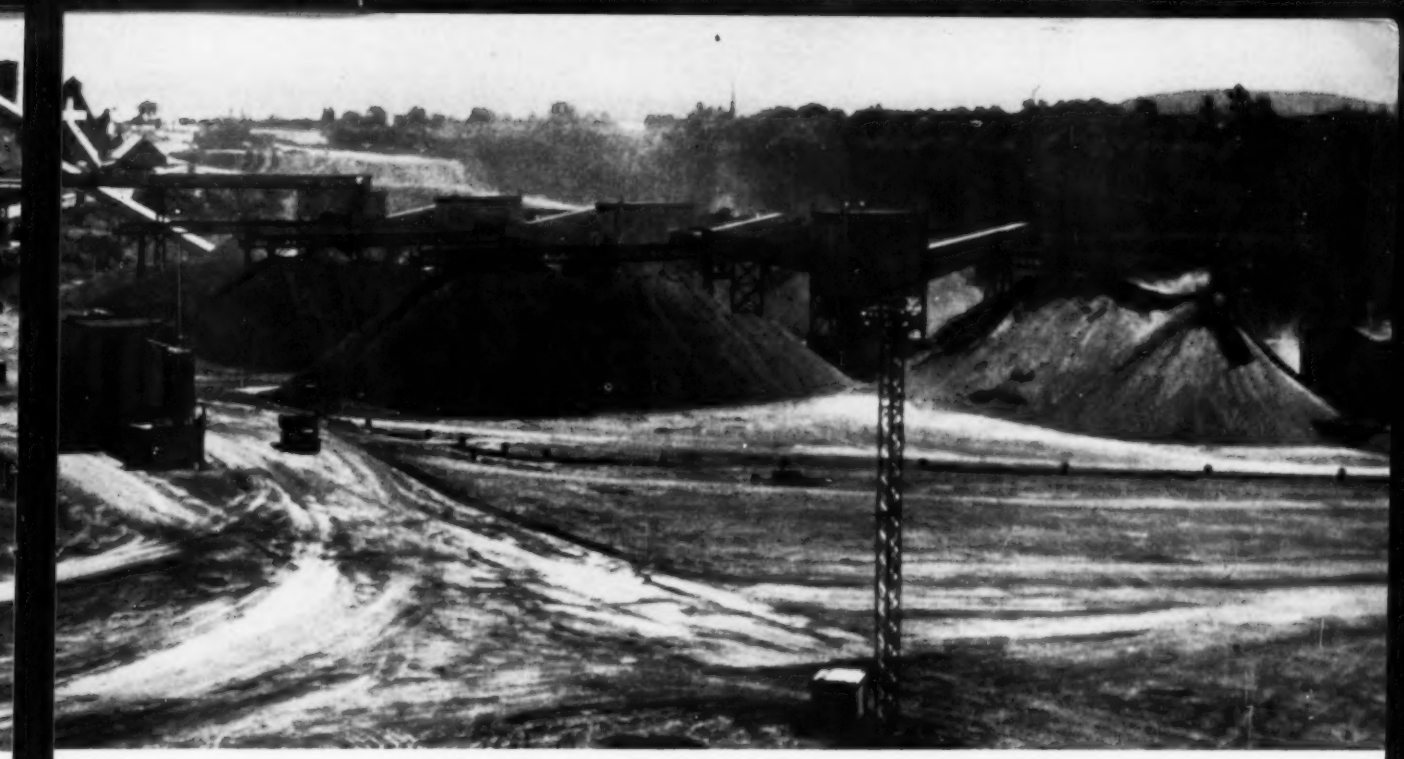
One of the biggest and most efficient stone-crushing plants on this continent is owned by The Highway Paving Company Limited of Montreal, which recently increased its capacity from over 400 tons per hour to over 1600 tons per hour.

Almost all of this operation is automatic. However, quadrupling production involved moving rock from quarry face to crusher in sufficient quantity to assure Highway Paving's booming operations of a continuous supply of crushed stone.

Seven Macks were given the job. Working under six-yard electric shovels, they shuttle from shovel to crusher, each making 10 trips an hour; the seven trucks average over 16,000 tons per day. The shovels really have to move to keep up with the hustling Macks, which are on the go 10 hours a day.

Highway Paving knows that its production of crushed stone is dependent on equipment that must maintain "the pace that kills", day after week after month, without crippling breakdowns. Their Macks

Mack being loaded by one of the six-yard electric shovels. The Macks take a brutal beating from the seven-ton impact of broken limestone dropped with each shovel pass . . . but come right back for more.



rock per 10 hour day with 7 trucks

have proved that they are worthy of this dependence. In fact, no other make of dump vehicle is used in this quarry.

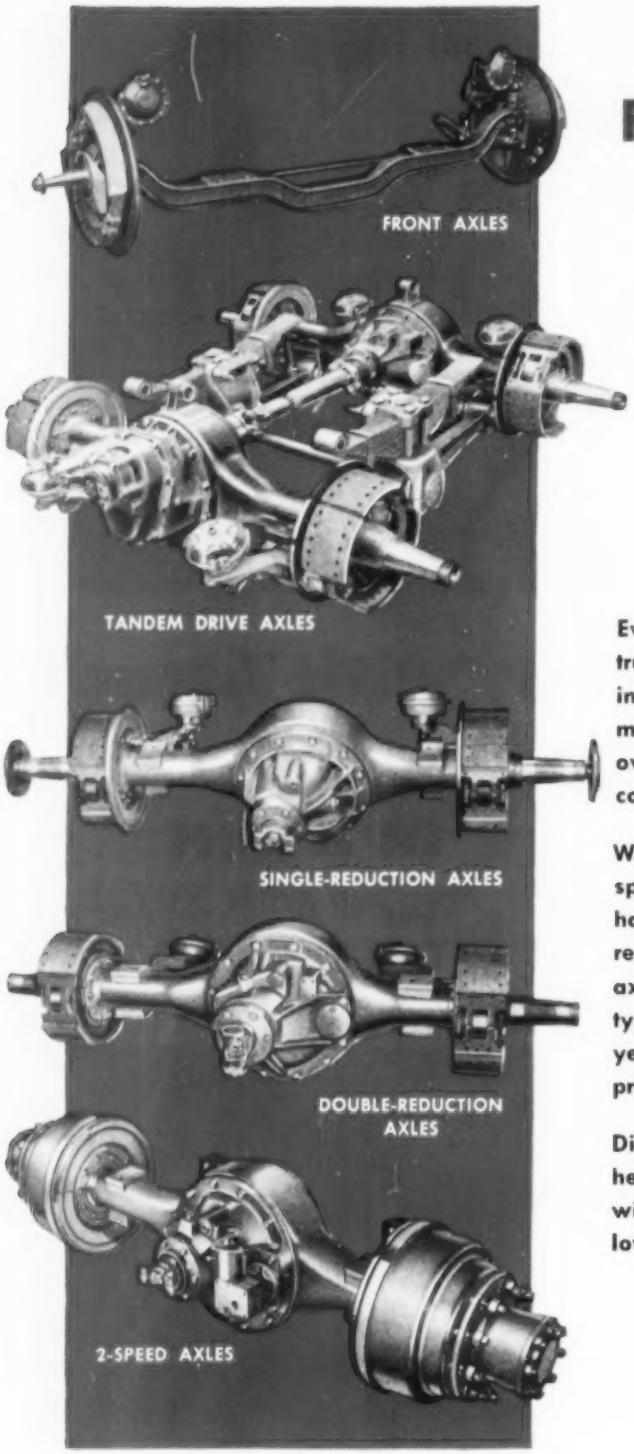
Macks have everything it takes for dependable, profitable quarry, mine or construction hauling. Your nearest Mack representative will be glad to give you the names of Mack users in your area who are racking up new production records, with minimum down time and top economy. Mack Trucks, Inc., Plainfield, New Jersey. In Canada: Mack Trucks of Canada, Ltd.

MACK
first name for
TRUCKS

Dumping rock into Highway Paving's huge crusher which is so located that trucks can dump into it from both sides. Number of loads emptied into crusher are counted electronically, and tonnage crushed is determined by belt weighing equipment.

Enter 38 on card, page 211

For Top Performance and Lowest Cost Per Mile—



You Must Have the RIGHT TRUCK for the Job—

★

and the RIGHT AXLE on the Truck!

Pick the RIGHT AXLE from Eaton's Full Line of Types and Capacities

Every hauler knows how important it is to buy trucks that are RIGHT FOR THE JOB. Dollars invested for ample capacity and the right equipment to handle the job, are paid back many times over—in reduced maintenance, lower operating costs, and longer truck life.

When you buy a truck, it is important that you specify the RIGHT AXLE for the job. Your kind of hauling may call for single reduction, double reduction or 2-speed—and perhaps tandem drive axles. For you there is an Eaton Axle of the right type and in the right size—backed by almost 50 years of axle manufacturing experience, and by proven performance in more than 2-million trucks!

Discuss your hauling job with your truck dealer—he'll be glad to recommend the Eaton Axle that will give you more and longer service at the lowest cost per mile.

EATON

EATON AXLE DIVISION MANUFACTURING COMPANY CLEVELAND, OHIO

Enter 41 on card, page 211 →

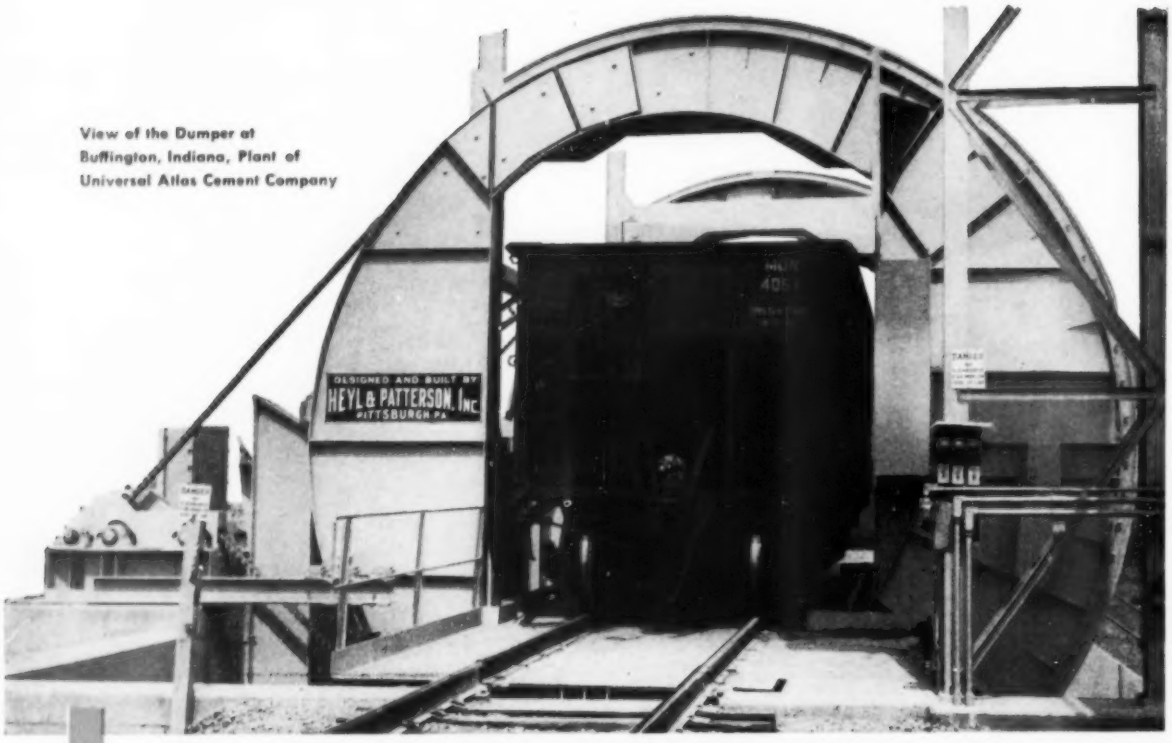
Lower housekeeping costs? Pangborn Dust Control! Here's why!

Yes, this fascinating booklet *tells* you why. It tells you what Pangborn Dust Collectors have done for many different companies in many different fields. How they have cut plant housekeeping costs for these firms . . . lengthened machinery life, improved employee efficiency and morale, reclaimed material for salvage. How Pangborn can give *you* these benefits.

Why Pangborn Dust Control? Because Pangborn offers the most efficient methods of dust collection on the market. Pangborn has spent 50 years dealing with dust problems . . . experience that is incorporated in every proposal. And Pangborn's extensive line of wet and dry collectors means that one of these units can be adapted with maximum effectiveness to *any* problem.

Send for your *copy of "Out of the Realm of Dust." And remember: the Pangborn Engineer in your area will be glad to take off his jacket and go to work on your dust problem at no obligation.* PANGBORN CORP., *5300 Pangborn Blvd., Hagerstown, Md. Manufacturers of Dust Control and Blast Cleaning Equipment.*

Pangborn CONTROLS **DUST**



View of the Dumper at Buffington, Indiana, Plant of Universal Atlas Cement Company

THE NEW H & P ROTARY CAR DUMPER

unloads Bulk Materials as fast as you can deliver cars

- Dumper is designed to rotate, dump and return to initial position in just one minute.
- Rotation can be stopped instantly at any position with car and platen firmly held in place.
- External and movable counterweights have been eliminated.
- Optional platen-mounted electronic scale is simple, accurate and economical.
- Optional car retarder on dumper permits economical and safe car spotting by dumper operator.

MAIL COUPON TODAY FOR NEW DUMPER BROCHURE 957

IT PAYS TO WEIGH AS YOU UNLOAD your bulk materials.

The new H & P Rotary Car Dumper, equipped with electronic scale platen (Patent Pending), unloads and weighs in one operation without requiring additional personnel or separate facilities.

Integral load cells permit instant weighing and light-weighing of car in compliance with National Bureau of Standards acceptance tolerance, and printing of weigh-tickets.

Exceptional accuracy and trouble-free performance are assured due to absence of wearing parts—no levers, fulcrums, etc.

For the most economical car weighing and dumping operation, investigate the new H & P Rotary Car Dumper!

HEYL & PATTERSON, INC., 55 Fort Pitt Blvd., Pittsburgh 22, Pa.

Please send me my copy of the H & P Dumper Brochure 957.

Name_____ Title_____

Company_____

Address_____

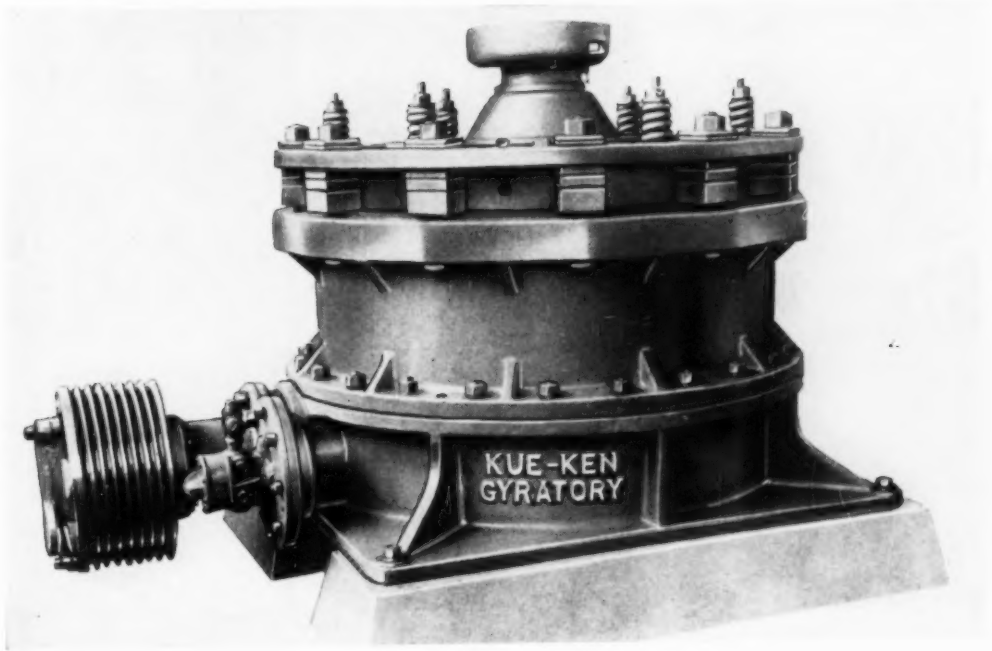
City and State_____

Heyl & Patterson INC.

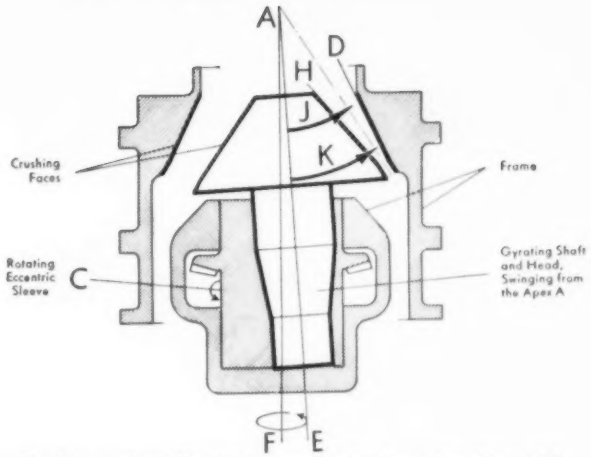
55 FORT PITT BLVD. • PITTSBURGH 22, PA.

PHONE COurt 1-0750

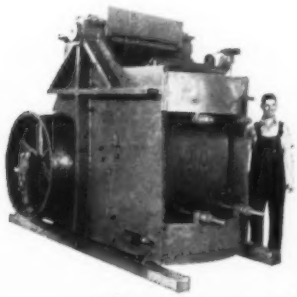
Compact KUE-KEN® for economical gyratory crushing in any operation



Fitting easily where headroom is limited, Kue-Ken gyratory makes profitable secondary crushing practical in any flowsheet. Compact, strong, without excess weight, choke-fed Kue-Ken is adaptable to either a permanent or portable installation. Designed on the exclusive Kue-Ken "crushing without rubbing" principle that practically eliminates the main cause of liner wear, Kue-Ken liners give far longer service under continuing, hard materials crushing. For lowest cost-per-ton crushing, design your operation around Kue-Ken jaw and gyratory crushers.



Kue-Ken crushes without the upward abrasive action that quickly wears out liners in ordinary crushers. See how crushing faces pass through crushing zone on arcs J and K to crush rock squarely. Only Kue-Ken operates on this principle of "crushing without rubbing."



KUE-KEN® CRUSHERS

"Crushing without Rubbing"

STRAUB MFG. CO., INC. 8385 Baldwin St., Oakland 21, Calif.

Jaw Crushers Gyratory Crushers Overhead Eccentric Crushers Revolving Screens Classifiers Feeders Rib Cone Ball Mills Concentrating Tables Vibrating Screens

DEALERS:

SEATTLE, WASH. ..... Washington Machinery Co.
VANCOUVER, B. C. ..... Universal Equipment Co.
SALT LAKE CITY, UTAH ..... Lund Machinery Co.
SAN ANTONIO, TEX. ..... Clasner Equipment Co.
PORTLAND, ORE. ..... Contractors Equipment Co.
LOS ANGELES, CALIF. ..... Garlinghouse, Fremon Co.
PHOENIX, ARIZ. ..... Stapley's

Pennsylvania Crusher Division, Exclusive Licensed Eastern Manufacturer and Distributor, 323 S. Matlack St., West Chester, Penn.
Armstrong Whitworth (Metal Industries) Ltd., Authorized Licensed Manufacturer and Distributor. Close Works, Gateshead-upon-Tyne 8, England

"With our TD-24 we are pushing 40-ton rock slabs —dozing and ripping at a 50% better rate than with our other big tractor," states Owner L. J. Luttjohann. He removes a 24-inch-thick hard rock stratum; rips and dozes-off a soft rock layer with his "24" to uncover high-grade limestone deposits.

How Planet Power-Steered TD-24 outproduces clutch-steered competitor by an amazing 50%

...stripping for Luttjohann Stone Co.,

States Operator Alvin Hanson "This new TD-24 Torque Converter is great for my ego. The other dozer's operator works harder, but I move at least one-half more material per day than he will!"

Dozing 40-ton chunks of stone aside—ripping worthless rock layers into movable spoil—this Planet Power-steered TD-24 is outproducing its 20-ton steering-clutch-steered competitor, by the amazing margin of 50%!

Both crawlers are working under identical conditions. Both are ripping and stripping overburden for the Luttjohann Stone Co., near Topeka, Kansas.

The decisive difference is: the TD-24 has "live" power on both tracks all the

overburden!

Topeka, Kansas

time. Planet Power steering eliminates load-limiting "dead-track drag." You don't "half-kill" your power and traction to guide the TD-24—as you must with any king-sized steering-clutch tractor. You can even "equalize" TD-24 track speed to steer accurately with big offset loads!

Both king-sized crawlers cost approximately the same to buy and operate. But the TD-24 Torque-Converter does half-again as much as the other rig!

Prove to yourself what a tremendous profit-earning advantage the Planet Power-steered TD-24 gives you over anything else on tracks. Compare the huge capacity increase Planet Power steering delivers on benching, whether on turns or straightaway. Add up the extra 'dozing passes you get per day from exclusive Hi-Lo shifting—and from high TD-24 reverse speeds. Ask your International Construction Equipment Distributor for your demonstration!

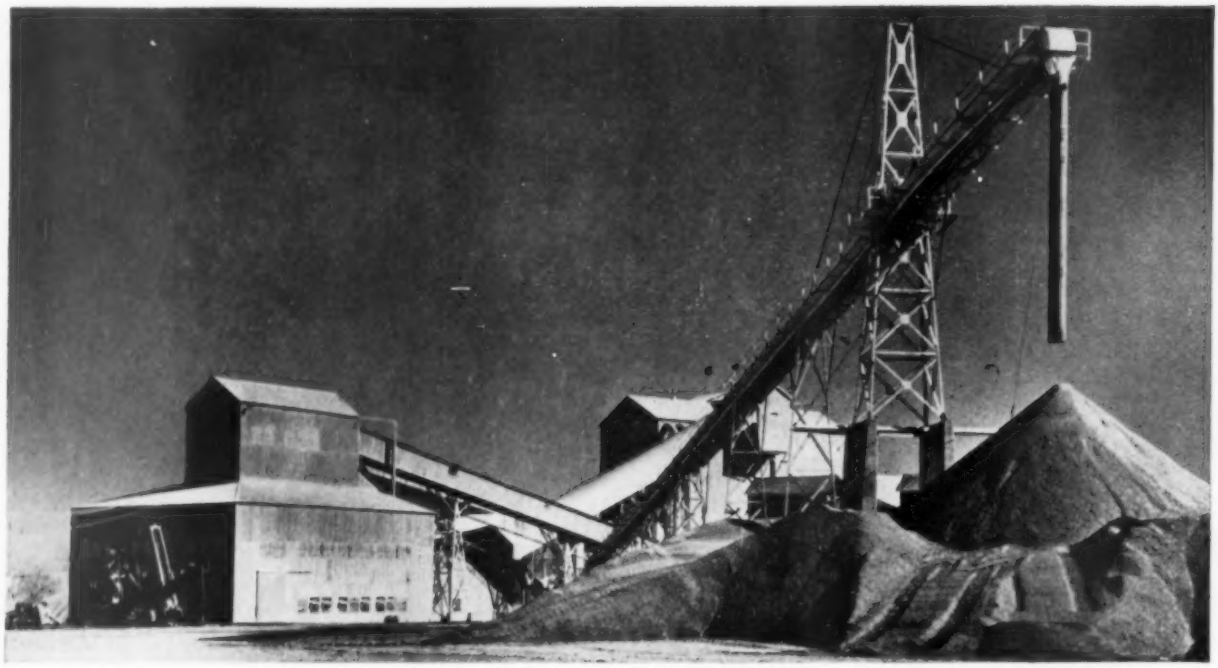
International® Construction Equipment

International Harvester Co., 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

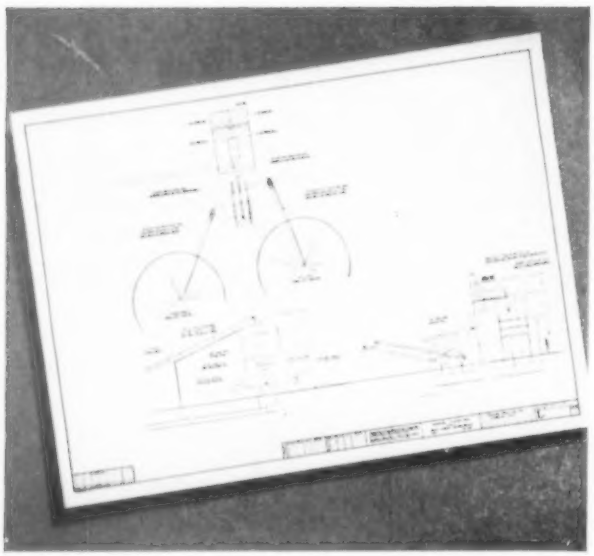
Enter 44 on card, page 211

NOW! CUSTOM ENGINEERED PLANTS



COMPLETE PLANTS . . .

H-R Rock Products Engineering Group from Flow-Sheet Development



Clear, orderly, integrated plans such as these developed by the Rock Products Engineering Group result in efficient, low cost operation.

Whether you are planning a new plant or a plant addition you'll want expert engineering assistance all the way. Now, at minimum cost, the Hewitt-Robins Rock Products Engineering Group can put over sixty-five years of aggregates industry experience to work for you right from the start. Equipment selected from Hewitt-Robins standard stock units assures you of fast delivery, quick installation, low maintenance costs, with replacement parts as near as your telephone, and proved performance for many years.

. . . And the men from Hewitt-Robins are available every step of the way to help make the most economical use of your resources in building an installation geared to produce profits. Here's how:

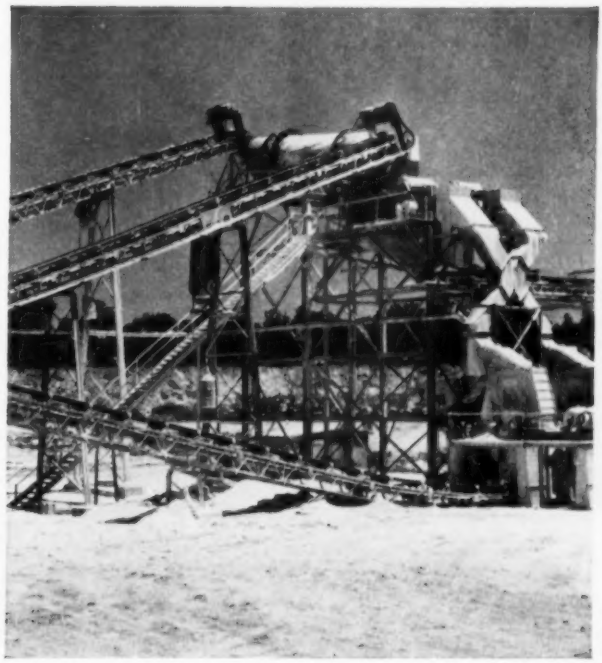
FLOW-SHEET DEVELOPMENT—A thorough analysis of your requirements from raw material to product, plus the utilization of the most efficient equipment selection, is the basis for flow-sheets tailored for maximum flexibility.

PLANT LAYOUT—The most practical use of terrain and access, modern conveying and sizing systems, and the latest developments in automation will be included on your flow-sheet.

EQUIPMENT SELECTION—The combined knowledge of *experts* on all phases of your plant (conveying machinery, screens, crushers, conveyor belts) is used in recommending the right equipment for your particular job.

FROM STANDARD STOCK UNITS

ADDITIONS . . .



COMPONENT UNITS

Plans Your Expansion at Lowest Cost to Follow-Up Maintenance

DESIGN—Hewitt-Robins, using the latest techniques in structural design, foundations, etc., engineers your plant for fast, easy erection—either by your crew or ours.

INSTALLATION—Hewitt-Robins will build the plant complete or furnish any specialized assistance you may require.

MAINTENANCE—We also offer maintenance plans which provide for regularly scheduled inspections by our maintenance experts, on-the-job training of your maintenance personnel, and well thought out spare parts programs. This is especially important because H-R manufactures conveyor belt, idlers, screen cloth, as well as replacement parts for other components . . . items that are integral parts of any maintenance program.

This kind of integrated planning is possible because of Hewitt-Robins' wide experience and technical know-how in materials handling. Each manufacturing division of Hewitt-Robins specializes and is expert in its own phase of design and manufacture. The Rock Products Engineering Group coordinates this experience and technology to provide you with better integrated plant operation at minimum cost.

You'll find, too, that Hewitt-Robins' nation-wide network of strategically located warehouses brings savings to users of H-R industrial machinery products through faster fulfillment of new orders . . . faster delivery of replacement parts . . . fewer lost production hours when mechanical breakdowns occur.

Hewitt-Robins manufactures a rugged line of equipment for use in the rock products industry, including idlers, conveyor belt, vibrating screens, screen cloth, heavy duty scalpers, feeders, sectional conveyors, reducers, level indicators, and trippers. To find out how Hewitt-Robins products and services can help you, consult your classified telephone directory for the nearest H-R representative, or contact Hewitt-Robins, Stamford, Connecticut.

HEWITT-ROBINS

THE NAME THAT MEANS EVERYTHING IN BULK MATERIALS HANDLING SYSTEMS . . .
DESIGN, MANUFACTURE, INSTALLATION, AND SERVICE OF ALL COMPONENTS

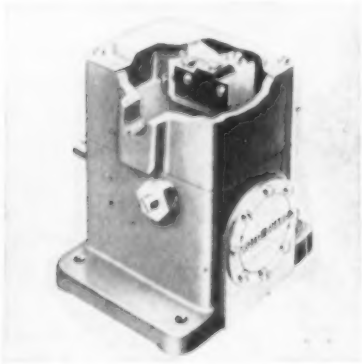
New Machinery

and Equipment

For Further Information Use Card on Pages 211-212

● Lippmann Engineering Works, Inc., offers a new line of mobile hoppers mounted on structural beam chassis frames.

Pictured above is a 10 cu. yd. hopper, 8 ft. square, feeding onto a belt conveyor with a discharge height of 9 ft. Overall height of the unit is 10 ft. 9 in., width is 8 ft., and length is 27 ft. Length of the truck frame is 17 ft. **(351)**



● A new motion indicator, designed for use in operations in which positive indication of motion or lack of motion is required, is available from The Bin-Dicator Company. Called the Roto-Guard, the new protective device is a means of converting motion of various types into a signal impulse which may be used to energize an alarm system to warn operating personnel or to operate control switches automatically. The device provides a simple means of protecting conveyors, elevators, feeders, etc., located in remote or hard to observe locations.

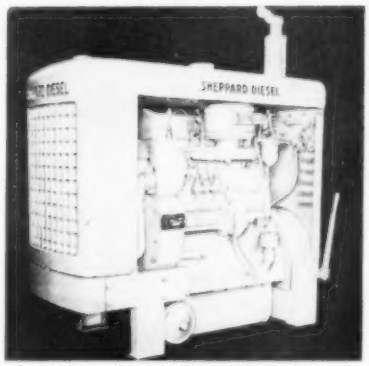
Roto-Guard is connected to any slow turning shaft by coupling, V-belt drive, or other means. As long as the driven shaft rotates, the Roto-Guard operates, and by means of a circulating pump and pressure-actuated switch, indicates normal operation. In the event that the driven shaft to which the Roto-Guard is connected stops, the Roto-Guard, by means of suitable signals, warns the operator.

The Roto-Guard can readily be wired into an interlock system, whereby the stoppage of one component in the chain of process equipment will automatically stop the other components in order to prevent damage.

The Roto-Guard is designed for operation at speeds of 10 to 150 r.p.m., and is adjustable within that range. If the driven shaft operates at higher speeds, a simple gear or pulley reduction may be incorporated. **(352)**

● With the introduction of Plate-Mate, a new line of welding electrodes, the Lukens Steel Company is now offering both its own range of plates and its own line of matching electrodes made to Lukens' specifications.

In addition, Lukens has simplified the process of selecting the proper electrode for each of the more than 50 types and grades of alloy, alloy-clad and carbon steel which it produces. The new Lukens Plate-Mate catalog keys each classification of electrode to the A.S.T.M. specification number of each type of steel plate. **(353)**



● Addition of a new 100 hp. diesel to its line has been announced by the R. H. Sheppard Company, Inc.

Designated the Model 16B, the unit is a smooth running engine that operates with a clean exhaust from no load to full load. Construction features include replaceable wet-type liners, main bearings between each throw and at both ends of the crankshaft, full pressure lubrication with full-flo filtration, oil bath air cleaner, oil-cooled pistons, 22 to 1 compression ratio, and Sheppard's simplified fuel injection system. **(354)**

Enter 49 on card, page 211 ➔

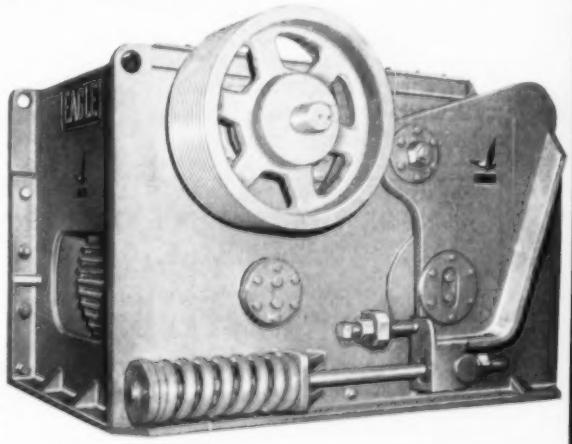
YOU CAN TAKE IT WITH YOU

EAGLE'S MODEL 6600 PORTABLE JAW CRUSHER

Helps you make more of that green stuff you *can't* take with you. Nearly every contractor knows that to meet today's rapidly sprawling road system *it's important to be portable.*

Eagle is keeping up with the changing times. Note, for example, on this single pass gravel plant the newly designed *low hopper* for front end loaders. Available in four crusher sizes—capacities from 40 yds. per hour on 1″ material up to 220 yds. per hour on 2½″ (based on crushing approximately 25% of the pit run gravel).

Can you afford not to be mobile in today's market? Our engineers keep their bags packed—ready to help you analyse and economize. Write today! Phone collect—Galion 2830-1—we're ready! (Specifications for the asking.)



NEW...EAGLE'S ROLL CRUSHER

Ever think a crusher would look this good? Well, this one does! It's Eagle's new Roll Crusher. And performance is right in step with its looks, too! Roller bearings throughout. All steel cut gears running in oil. Two sizes—24 x 20, 30 x 24. Send for complete specifications—engineering help!

EAGLE

JAW AND ROLL CRUSHERS. PORTABLE PLANTS. CAGE AND HAMMERMILLS. CONVEYORS. LOADERS.

CRUSHER CO., *Inc.* GALION OHIO·U·S·A

In this test demonstrating the added toughness of Clupak, a cue ball rips through the surface of regular kraft papers (left) while another ball hits Clupak paper and bounces without rupturing the sheet.

● A versatile new stretchable paper of unusual strength has been developed by the West Virginia Pulp and Paper Company under a patent held by Cluett, Peabody & Company, Inc. In Westvaco's Charleston, S. C., mill, kraft grades of the new paper are being manufactured commercially on a machine capable of producing 225 tons of finished product daily.

Toughness, smoothness, stretchability, and pliability are features of the new paper, which will be marketed under the brand name of Kraftsman Clupak. Varying degrees of controlled strength imparted by mechanical means gives the new paper unusual toughness, which is particularly significant in packaging applications. Smooth in surface, the extensible paper resembles a regular sheet of paper, except for its flexibility and toughness.

Kraftsman Clupak paper is reported to have up to 20 percent more stretch than regular kraft paper. Since it is tougher, less Clupak paper is required to perform a given job than regular kraft paper of the same weight basis.

Licensing rights will be extended to other paper manufacturers through a new company, Clupak, Inc., organized jointly by West Virginia and Cluett, Peabody.

The first Clupak papers being sold commercially are kraft grades to be used primarily in the manufacture of multiwall bags and in other applications in which unusual strength is required. (355)

● Pettibone Mulliken Corporation has available for its Speed Swing loader a new clamshell attachment with five different bucket widths—18 and 24 in. for digging rock and dirt; 30 and 36 in. for handling light materials; and a 60 in. bucket for handling rubbish and snow. The maximum dumping height of the clamshell attachment is 9 ft.; maximum digging depth is 10 ft.

The Pettibone Speed Swing has a 180 deg. free swing of the boom—90 deg. right and left—which eliminates the major part of machine maneuvering. The loader with the clamshell attachment is readily converted back to a bucket loader or fitted with other Pettibone attachments. (356)

● A new line of automatic dragline buckets has been designed by the Page Engineering Company for sand, gravel, and quarrying operations. The new design features a longer and higher basket which carries out more payload on every swing. The dotted lines on the above photo indicate the added capacity built into the new bucket series.

The new buckets use a shorter dump rope which throws the front of the bucket sharply back when hoisting to prevent spillage of material. The new sand and gravel bucket is advantageous in underwater digging when the material has a natural tendency to flow with the water in a direct line from the rear top of the basket to the lip.

Made of USS "T-1" steel, the buckets are available with or without perforations in sizes from ½ cu. yd. and up. (357)

FOR THE CONTROL OF ROCK, ORES, ETC.
TO CRUSHERS, CONVEYORS, ETC.

ROSS CHAIN FEEDERS
ROSS DROP-BAR GRIZZLY FEEDERS

ROSS SCREEN & FEEDER CO.
100 Quimby Street
WESTFIELD, N. J.

ROSS ENGINEERS LTD.
11 Walpole Road
SURBITON, SURREY, ENGLAND

CANADIAN LICENSEE: DORR-OLIVER-LONG LTD. ORILLA, ONT.

Enter 50 on card, page 211

B.F.Goodrich

B.F.Goodrich Rock Logger tires can be retreaded 3 times, ready-mix company reports

GRAYSTONE of Olympia, Washington specializes in ready-mix concrete. Trucks travel on and off-the-road in stop-and-go service, rolling over such tire-killers as rocks and steel scraps at construction sites. Yet Graystone finds its tires often can be *retreaded 3 times* with practically new tire service from each retread. Why? Graystone uses B.F.Goodrich Rock Logger tires!

Graystone Dispatcher George Meyer says, "B.F.Goodrich Rock Logger tires give the kind of traction we need in rough weather." Husky Rock Logger cleats dig in to give you maximum pulling power in forward or reverse. "They give rugged dependability around rough construction work," he adds.

B.F.Goodrich Rock Logger tires are available with FLEX-RITE NYLON cord construction. FLEX-RITE NYLON withstands double the impact of ordinary cord materials, resists heat blowouts and flex breaks. Result: This B.F.Goodrich cord body outwears even the extra-thick Rock Logger tread, can often be retreaded again and again!

Your nearby B.F.Goodrich dealer is listed under Tires in the Yellow Pages of your phone book. See him today, and start enjoying the extra savings B.F.Goodrich tires give. *B.F.Goodrich Tire Co., A Division of The B.F.Goodrich Co., Akron 18, Ohio.*

Specify B.F.Goodrich Tubeless or tube-type tires when ordering new equipment

B.F.Goodrich ***truck tires***

© The B.F.Goodrich Company

Quick connection for better blasting...

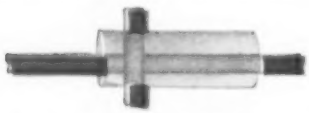
AUSTIN DETONATING FUSE and CONNECTORS

Effective blasting depends upon use of a powerful detonating fuse with proper connection between trunk and lead lines.

That explains why successful strip mines and quarries rely on Austin Detonating Fuse and plastic Connectors. This combination provides a quick hook-up of high strength fuse that won't slip, slide or lose contact in any weather or under any job condition. It also eliminates tying of knots and the resultant possibility of their becoming untied.

Blasting goes according to schedule with Austin Detonating Fuse, for it possesses more than enough power to initiate the entire charge in every hole. Protected with a waterproof covering, it is tough, but flexible . . . won't chip, peel or crack while being laid. It's insensitive to shock, abrasion and stray electrical currents.

AA-4482



First, thread fuse from shot hole through length of connector. Then, press the trunk line into the grooved slots.

Next, return the branch line through the end of the connector on the other side of the trunk line. Pull both ends of branch line tight for positive connection.

USED IN 1833 AUSTIN & EVER SINCE

AUSTIN
POWDER COMPANY
CLEVELAND 13, OHIO

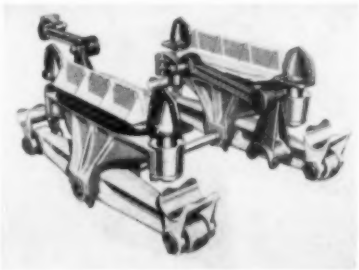
explosives ◆ permissible dynamites ◆ mine tools
◆ detonating fuse ◆ AP drill heads ◆ Akremite ◆ primers

Enter 52 on card, page 211

● Flygt mining and contractors draining pumps are heavy-duty, electric, submersible units which need no priming and run dry without damage. Lightweight and easy to handle, the Flygt centrifugal pumps require little maintenance or supervision. They are frost-proof, fire-proof, and resistant to salt water.

Flygt submersible pump models range from 1.5 hp. up to 65 hp., and provide capacities from 50 Imp. g.p.m. to 2,250 Imp. g.p.m. and heads up to 200 ft. per pump (in the larger sizes).

Manufactured by the Stenberg Corporation AB, of Stockholm, Sweden, Flygt pumps are distributed in the United States by the Stenberg Manufacturing Corporation (east of the Mississippi) and Stanco Manufacturing & Sales, Inc. (west of the Mississippi). **(358)**

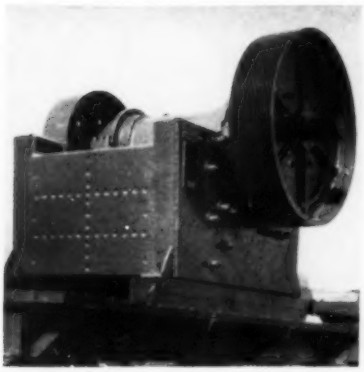


● Hendrickson Manufacturing Company is producing a new air suspension tandem for axles, the Series AR. Tandem air spring units in this new series are interchangeable with all other Hendrickson suspensions. This air spring unit is designed for use with all standard

axles, both drive and trailer types, and features lightweight aluminum construction and rubber bushings which require no lubrication.

The new suspension system incorporates an equalizing beam construction which reportedly reduces the effect of road irregularities by 50 percent and prevents load transfer from one axle to another. Accelerating and braking torque are absorbed by a vertical drive pin design. Therefore, the air springs are relieved of any function except the cushioning of the load.

Leveling valves keep the vehicle frame at a constant height and automatically compensate for any load with air pressures which vary from 3 to 80 lb. Spring rates are thereby tailored to the amount of weight carried. In the case of accidental loss of air in the system, the Hendrickson air tandem functions even under full load because of built-in rubber safety cushions. **(359)**



● Pioneer Engineering, Division of Poor & Company, announces its newly-developed Size 2036 jaw crusher with a 20 in. by 36 in. feed opening which will reduce material down to 3 in.

The jaw crusher features longer jaws for better gripping angle, hydraulic adjustment, split hub flywheels, and improved toggle action. Because of the all-welded steel base with double wall, box-type construction on the sides and both ends, this crusher combines high strength with comparatively light weight. Machined seats for the jaw plates provide for longer manganese wear with reduced possibility of fatigue cracking. Bearings are self aligning double roller type. **(360)**

●This truck went on tour last month to demonstrate the Worthington Corporation's new truck-mounted power-take-off rotary air compressor. More than 50 major cities will be visited and more than 150 demonstrations will be given before the tour is concluded early this fall.

A range of Worthington's Blue Brute air tools which can be operated by the compressor are carried on the truck to demonstrate the versatility of this self-contained unit which draws all its operating power from the engine of the vehicle on which it is mounted.

The power-take-off unit is belt-driven and completely controlled from the cab. Its variable capacity control allows it to maintain a consistent delivery of 125 c.f.m. of air at a pressure of 100 p.s.i.

The complete unit, weighing 950 lb., includes a two-stage, oil-cooled rotary air compressor, speed control, engine governor, oil cooler, air storage tank, oil separator, and oil storage receiver, all mounted on a common base. **(361)**

WHAT ARE YOUR RESERVES?

●

LET US HELP YOU FIND OUT

●

Coal in Kentucky . . . Uranium on the Colorado plateau . . . Bauxite in the Ozarks . . . Limestone in Pennsylvania . . . Copper in Montana . . . These are but a few examples of the extent of our operations. Throughout the United States and even in many foreign countries we have successfully explored and proved ore reserves for our many customers, and where normal methods have failed, special techniques have been developed. In the Gas Hills Area of Wyoming, for example, we successfully cored the loose sand and siltstone where others had failed by "freezing" the material. Our personnel and equipment are stationed throughout the United States awaiting your call.

SPRAGUE & HENWOOD, Inc.
SCRANTON 2, PA.

S&H

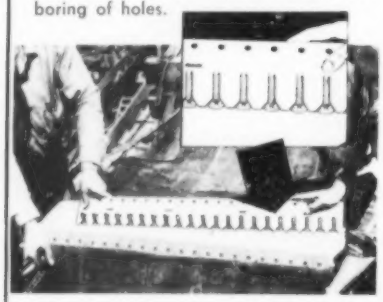
New York—Philadelphia—Atlanta—Pittsburgh—Grand Junction, Colo.—Buchans, N.F.

Enter 53 on card, page 211

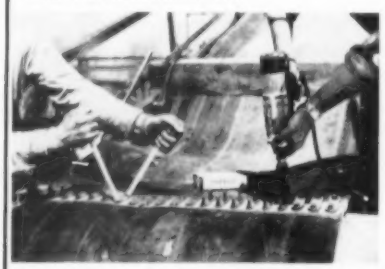
NEW
FLEXCO
POWER TOOLS
CUT APPLICATION TIME
IN HALF

Your two man belt team can now join a belt 30" wide in 15 to 20 minutes . . . using the new FLEXCO Power Tools.

The FLEXCO Power Tool Boring Bit used with electric or air impact tool speeds boring of holes.



New FLEXCO Templet positions bolts for quick joining of belts. Reaching under belt has been eliminated.

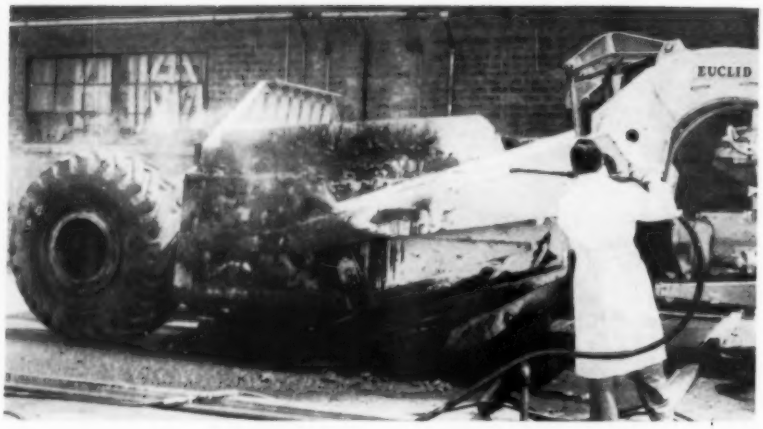


Running down nuts is fast with the new FLEXCO Power Wrench used with electric or air impact tool. Two Bolt Breakers are used together to complete the joint.

Ask your FLEXCO distributor or write to us for additional information.

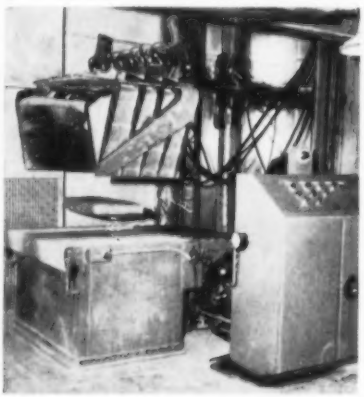
Flexible
STEEL LACING COMPANY

4623 Lexington Street • Chicago 44, Illinois
Enter 54 on card, page 211



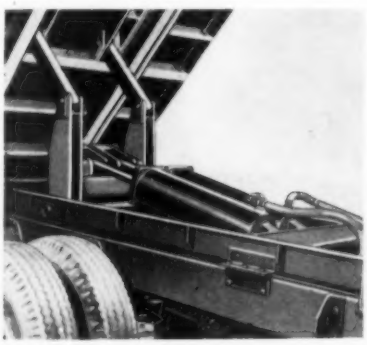
● Equipment used by pit and quarry operators can be kept clean with a minimum of effort with the new Clayton-Sellers combination steam and hydraulic-jet cleaning unit, Model CS 628.

The unit provides for either steam cleaning for high-impact, close-up work, or a hot hydraulic-jet stream for cleaning distant surfaces, particularly those covered with caked mud and clay, grease, etc. As a regular steam cleaner, the Model CS 628 produces 280 g.p.h. at 100 p.s.i. With the hydraulic jet, the unit delivers 500 to 600 g.p.h. at 220 p.s.i. to 210 deg. F. (362)



● An automatic flat drop testing machine which tests filled multiwall paper bags for strength and resistance to breakage has been developed by the St. Regis Paper Company. Electrically and hydraulically powered, the new machine has an average rate of testing of two bag drops per minute, and can be operated by one man.

The drop tester is operated by setting the dials on a control panel to determine the height and pattern of drops in a test series. Bags can be dropped from the same height over and over or drop height can be increased each time in increments of 6 in. from a minimum of 24 in. to a maximum of 10 ft. (363)



● Marion Metal Products Company introduces the Marion HD-88, a heavy-duty, twin-cylinder, double-arm-type underbody hoist for use under very large and heavy dump bodies. Carrying a capacity rating of 25 to 30 tons, it is the largest underbody hoist in the Marion line of hydraulic hoists.

The HD-88 features a specially designed arm system. The lift arm assembly is an integral steel plate weldment of massive proportions, designed to give moderate and well-regulated oil pressures. Solid construction of the arm structure protects the hoist frame and cylinders from twisting stress while the body is being raised.

The Marion HD-88 hoist has twin 8 in. cylinders, which are made of seamless steel tubing honed to a micro-finish with a bolted-type cylinder head. (364)

● Details on a one-piece bin and hopper pneumatic vibrator have been released by the National Air Vibrator Company.

According to the manufacturer, the Navco one-piece design uses no body assembly bolts to shear or stretch; eliminates housing springs

that require replacement; and incorporates an integral striking plate that cannot separate and leak air.

Navco air vibrators can be used under conditions where other vibration methods are inadequate, such as hazardous atmospheres, extreme moisture, outside applications in inclement weather, and magnetic dust locations.

Vibrators in the Navco Binmaster line are made in five different piston sizes from 1¼ to 4 in. for a variety of bin, hopper, chute, railroad car, and batching applications **(365)**

● The Louis Allis Company recently announced the availability of its all-weather climatized vertical hollow shaft motor in ratings up to 2,000 hp.

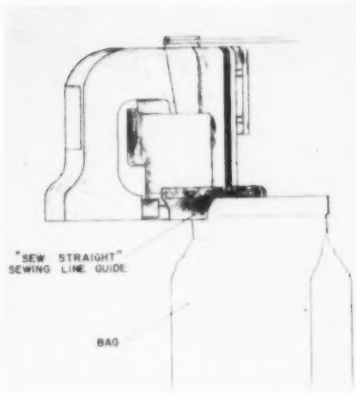
Climatized vertical hollow shaft motor design offers greater compactness for space savings and handling ease.

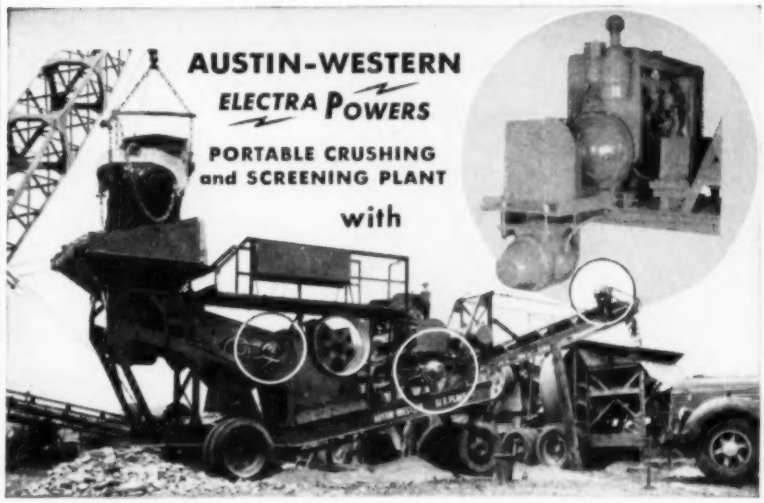
A maximum of two-high angular bearings are used in the motor to prevent excessive wear and reduced thrust capacity. Water-cooled Kingsbury type thrust bearings are utilized in extra-high thrust applications.

Because of high motor efficiency a minimum of cooling air is required. This permits low cooling air velocity and prevents dust and moisture from being drawn into the motor by the air stream. **(366)**

● Union Bag—Camp Paper Corporation has developed a new sewing line guide for multiwall bags which insures a constant, uniform sewn top closure. Called the Sew-Straight, the guide makes it possible to sew a straight line closure within 1 in. of the bag top. This elevation of the sewing line improves bag performance by increasing its available capacity.

The Sew-Straight sewing line guide is usd in conjunction with an "E" type sewing head. **(367)**



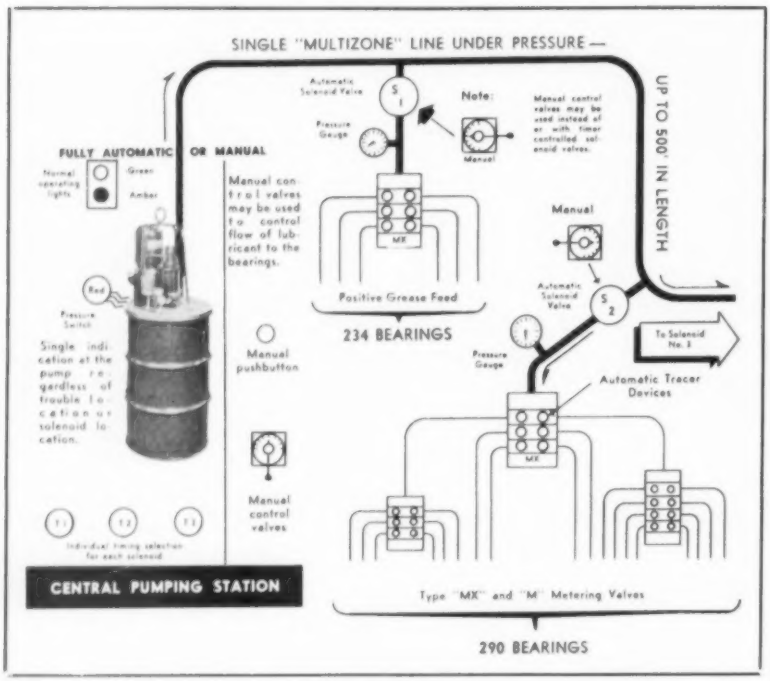


WINPOWER GENERATORS

Baldwin-Lima-Hamilton Corp.,—Construction Equipment Division—Lima, Ohio, manufacturers of AUSTIN-WESTERN crushing and screening equipment shown here, use WINPOWER generators for electric power. They know that by using WINPOWER powered electric motors and speed reducer drives on conveyors, feeders and screens they can eliminate long drive belts and drive shafts, expensive to buy and difficult to replace in case of failure in the field. *Whatever* your need there is a WINPOWER Generator for you. Generators as well as gasoline or diesel powered electric plants in capacities from 400 watts to 100 KW. You can save time and money with WINPOWER. See your WINPOWER Distributor or phone, write or wire at once for complete illustrated folder and specifications.

WINPOWER MFG. CO.
NEWTON, IOWA • U.S.A.

Enter 55 on card, page 211


SINGLE "MULTIZONE" LINE UNDER PRESSURE —
UP TO 500' IN LENGTH
FULLY AUTOMATIC
OR MANUAL
Note:
Manual control valves may be used instead of or with timer controlled solenoid valves.
Manual control valves may be used to control flow of lubricant to the bearings.
Positive Grease Feed
234 BEARINGS
Manual
Manual pushbutton
Manual control valves
Automatic Tracer Devices
Type "MX" and "M" Metering Valves
290 BEARINGS
CENTRAL PUMPING STATION

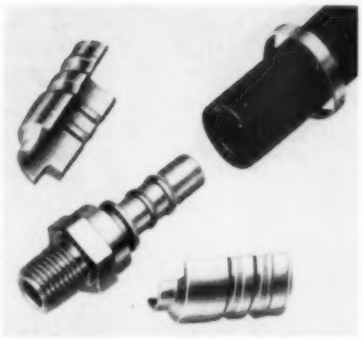
● Trabon Engineering Corporation, manufacturer of centralized lubricating systems, announces its new intermittent multizone lubrication system which enables a great number of bearings interspersed over a large area to be lubricated from one or more central stations. The Trabon Multizone lubrication system is ideal for cement plants, sintering plants, and other applications in which bearings are wide-spread and proper lubrication is a problem.

A Trabon automatic or electric barrel pump with timing controls acts as the lubricant reservoir for the system. Hundreds of bearings receive measured amounts of lubricant at the precise time needed; there is a single indication at the central station and at each individual zone that all bearings have been satisfactorily lubricated. (Each zone can provide for 50 to 100 bearings.) The single indication feature is positive assurance that all bearings receive the lubricant they need.

Trabon Multizone is a single line system which may be up to 500 ft. or more in length. Heart of the system is the Trabon metering valves which dispense exactly the amount of lubricant needed by the bearings. The Multizone lubricating system handles oils and medium-heavy greases. **(368)**

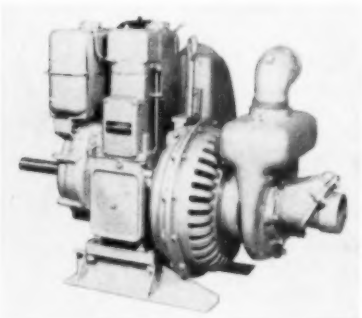
● New tin plate and steel containers have been developed by Vulcan Containers, Inc., to reduce blasting costs. These all-metal containers insure protection against water for use of ammonia nitrate explosive mixture.

Designed for either horizontally or vertically drilled holes, the new containers are manufactured in various diameters ranging from 4¼ in. through 10¼ in. The tin plate containers are 16¾ in. in height and have full double friction tops; the steel containers are 24 in. in height and have double seamed tops with a 73 mm. opening in the center for quick, easy filling. All containers have heavy wire carrying grips affixed to electrically welded cleat and are air tested to insure a leak-proof explosive container. **(369)**



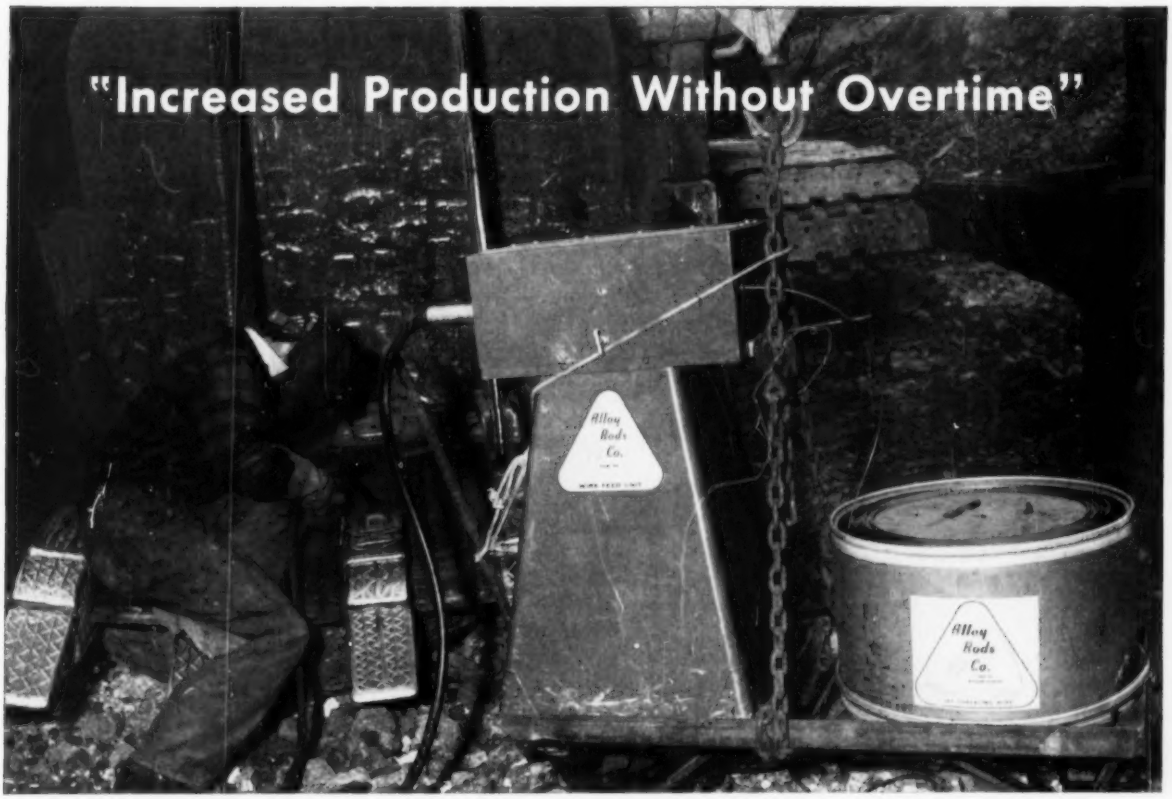
● The development of a new truck air brake hose and easy-to-assemble segmented fittings has been announced by the Aeroquip Corporation. The hose meets the requirements covered in S.A.E. Specification 40R2, and is manufactured in two types: 2550 Type A hose, which is mandrel-made and is available in lengths up to 60 ft.; and 2570 Type B hose, which is available in coils up to 300 ft.

Segmented fittings can be easily assembled and disassembled, using only a pliers, and can be reused many times. This permits on-the-spot replacement, reduces equipment downtime, and reduces stocking to a small inventory of bulk hose and some spare fittings. **(370)**



● Empire Corporation's diesel pumps, available in 15,000 and 20,000 g.p.h. sizes, are driven by air-cooled diesel engines of adequate power for 24-hour continuous operation.

Among the features of the 3 in. Empire pump is a built-in suction check valve, which eliminates a foot valve. The impeller is of the open non-clogging type. The pump shaft is protected with a renewable shaft sleeve. Suction hose strainer is furnished with each unit. **(371)**



Hard Surfacing Semi-Automatically with WEAR-O-MATIC Yields Big Production Dividends for Custom Shop

The 5½ yard bucket shown above is being built up with Wear-O-Matic Nickel Manganese. This is a vertical weld on one of the grizzlies in the bucket. Over this will be deposited one pass of Wear-O-Matic 15. Perry Westlake has cut in half the time required on a job like this by using the Wear-O-Matic process.

Perry Westlake, Owner, Westlake Service, Burgettstown, Pennsylvania, does his best work while other men sleep. His custom hard surfacing of equipment must be done between shut down time at night and start up time next morning. This rigorous schedule has been the downfall of many contract weldors. Westlake solved this problem with the new Wear-O-Matic Semi-Automatic Hard Surfacing Process. "It would take an additional gasoline driven DC welding machine and another trained hard surfacing weldor to turn out the production we now get using the Wear-O-Matic process," says Perry.

Easier, continuous welding at faster speeds; quicker set up time per job; simpler wire change over and longer wearing alloy deposits have increased the efficiency of Westlake's entire operation.

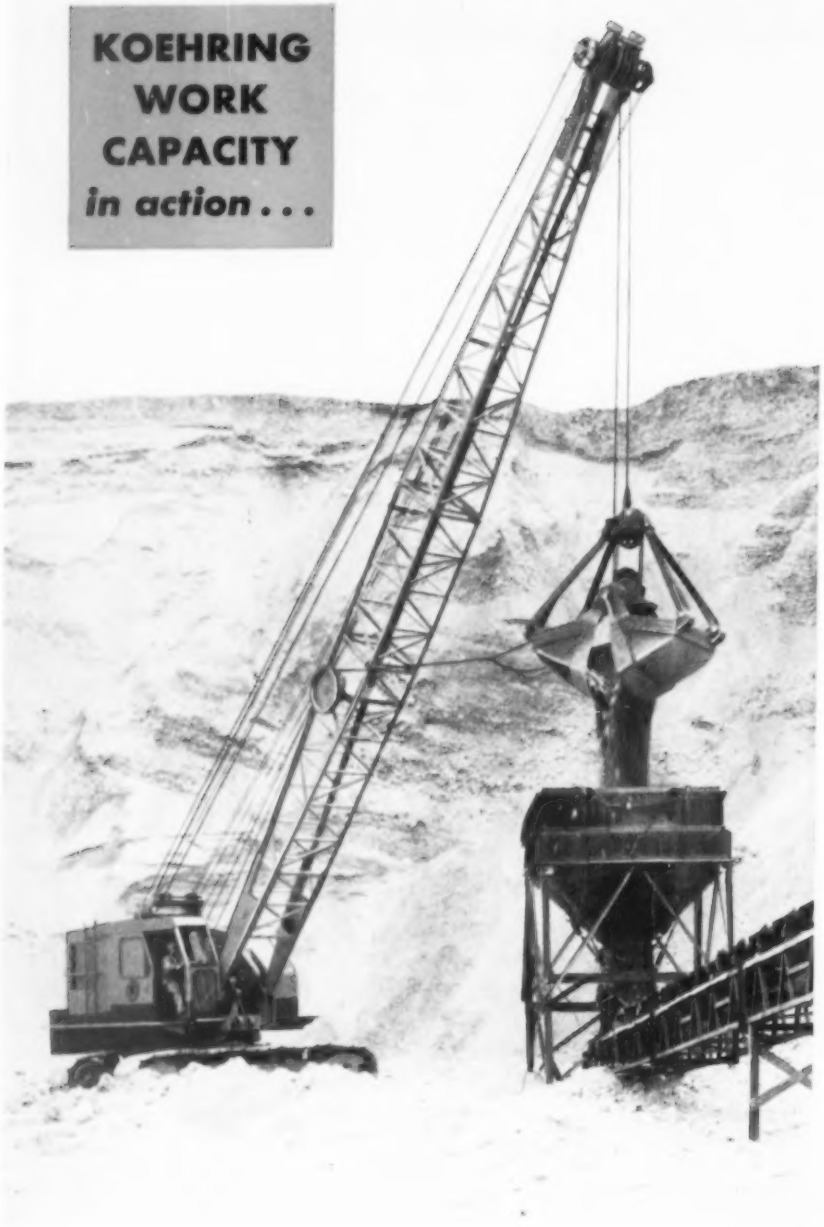
A complete range of build-up and hard surfacing alloys packed in convenient 100 pound Payoffpaks provides longer wearing deposits for all hard surfacing requirements. The low initial cost of the Wear-O-Matic process makes the change over to semi-automatic hard surfacing feasible for every maintenance shop.

Your weldors will like the ease and convenience of the Wear-O-Matic process and you'll like the increased production. Write for Bulletin HS-132, Alloy Rods Company, P. O. Box 1828, York, Penna.

Alloy Rods Company

YORK, PENNSYLVANIA • EL SEGUNDO, CALIFORNIA

KOEHRING WORK CAPACITY *in action . . .*



High-lift 1205 — Here's a heavy-duty, high-lift shovel (at right) that really puts stripping on a long-reach basis! For instance — with *3-yard* dipper on 40-foot high-lift boom, this Koehring 1205 has 42 foot-10 in. cutting height—at 45° boom angle — and dumps at a height of 31 feet-5 in. *Want more reach?* It also can be used with a 2½-yard dipper on a *50-foot* high-lift boom! This gives you 51 foot-4 in. cutting height — 40 foot-10 in. dumping height at 45° boom angle. On clamshell or dragline work, it handles 3 to 4-yd. buckets on 60 to 170 feet of boom.

Stripping 35 to 45 ft. of overburden from a 120-acre area (below), Koehring 605 dragline uncovered a coal vein 5 to 7 ft. thick. Working 18 hours a day, it stripped clay, common earth and shale. Bucket sizes on this heavy-duty 605 dragline range from 1½ to 2½ yards. Boom lengths — 50 to 110 ft., depending on materials. Converts to 36-ton lift crane, 1½-yd. standard or high-lift shovel.

Feeding gravel from bank into hopper, Koehring® 805 clamshell crane easily met plant production requirements at this pit. Belt conveyor system carries gravel from pit to crusher. Operators like the 805's ease of control, main-drum power clutches giving accurate "feel" of load, and spring-loaded air-released traction brakes. *You'll* like its big work capacities: 2 to 3-yard clamshell or dragline, 52-ton crane, 2-yard shovel. See Koehring distributor today.

KOEHRING HEAVY DUTY

K808 **KOEHRING** DIVISION OF KOEHRING COMPANY, Milwaukee 16, Wis. . .

Need a lift? Where you have heavy machinery to install, supplies to unload, materials to stockpile, consider the speed, mobility, and heavy lift service you can get with a Koehring rubber tired crane. Placing a 23-ton pump was easy work for this truck-mounted 545 — it has a top lifting capacity of 45 tons with 40-ft. boom at 15-ft. radius!

Koehring excavators and cranes also manufactured in:
• • • CANADA • ENGLAND • SPAIN • JAPAN

Quick facts on KOEHRING WORK CAPACITY:

	MODEL	TYPE OF MOUNTING	CRANE LIFT CAPACITIES (Rubber-tired machines rated at 85% of tipping load.)	
ON RUBBER	205	3-axle truck, or 21.5 mph Cruiser	30,000 lbs.	at 12-ft. radius
	305	3-axle truck, or 18 mph Cruiser	50,000 lbs.	at 12-ft. radius
	435	4-axle truck	70,000 lbs.	at 15-ft. radius
	545	4-axle truck	90,000 lbs.	at 15-ft. radius
		Size shovel	CRANE LIFT CAPACITIES (Crawler ratings based on 75% of tipping load.)	
ON CRAWLERS	205	½ Cu. Yd.	20,000 lbs.	at 10-ft. radius
	305	¾ Cu. Yd.	30,000 lbs.	at 12-ft. radius
	405	1 Cu. Yd.	40,000 lbs.	at 12-ft. radius
	545	(Crane only—85% rating)	90,000 lbs.	at 12-ft. radius
	605	1½ Cu. Yds.	72,300 lbs.	at 12-ft. radius
	805	2 Cu. Yds.	104,200 lbs.	at 12-ft. radius
	1205	3 Cu. Yds.	190,000 lbs.	at 12-ft. radius

Extra lift capacity means . . . **MORE WORK CAPACITY WITH ALL ATTACHMENTS**

. . . performance beyond the usual . . .

Design of high-speed precision machinery often calls for bearings which offer the utmost in load capacity, "hot hardness", dimensional stability. Each machine presents its own exacting requirements.

Fulfillment of unusual requirement combinations is a specialty at Rollway. Your selection of exactly the right precision radial cylindrical roller bearing is assured by:

- **A broad range of types and sizes, numbered in the thousands**
- **Retainers of standard bronze or "Rollube" ferrous alloy, in roller-riding, land-riding, or broached construction**
- **Crowned rollers**
- **Modification of any factor to meet your application**

ROLLWAY

MAXIMUM

BEARINGS

To further implement your choice, the Rollway Catalog and Engineering Data Book contains the first listing, by any manufacturer, of the thrust capacities of cylindrical radial roller bearings.

ROLLWAY BEARING CO., Inc., Syracuse 1, N. Y.

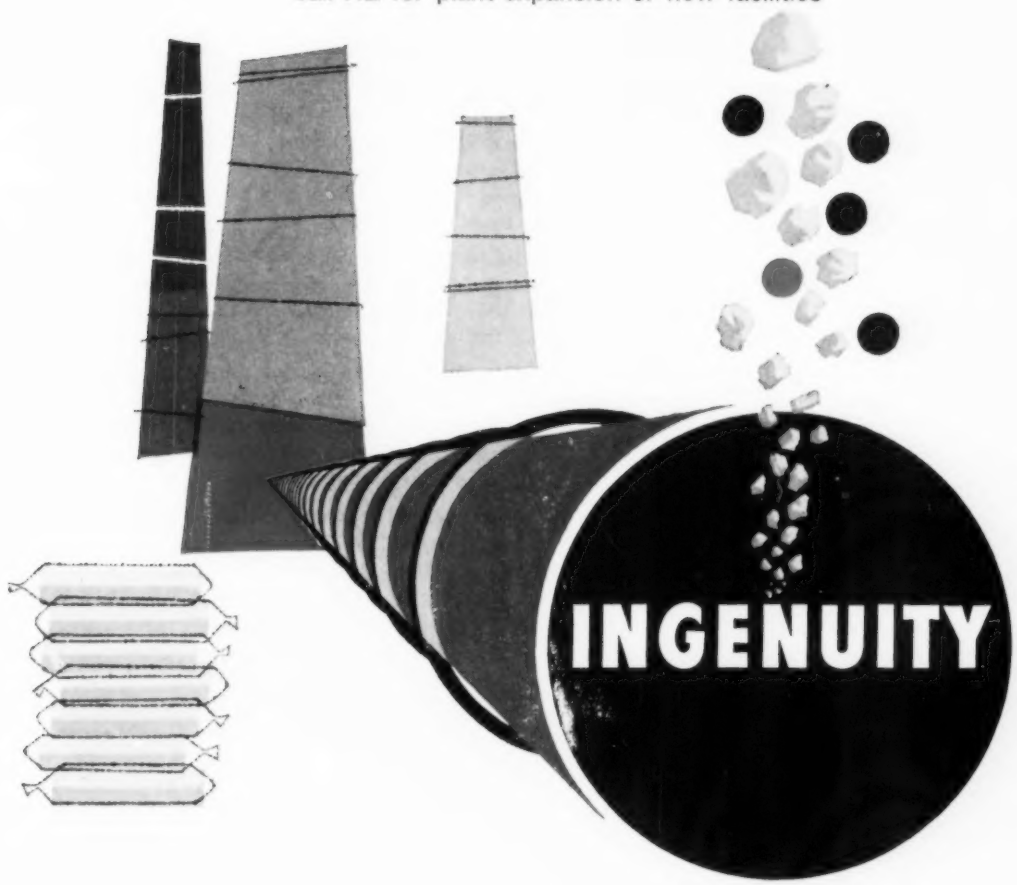
ENGINEERING OFFICES

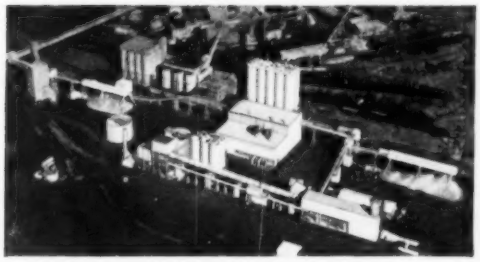
Syracuse • Boston • Chicago
Detroit • Pittsburgh • Seattle
Cleveland • San Francisco
Houston • Los Angeles
Philadelphia • Toronto

ROLLWAY
Maximum
ROLLER BEARINGS

Enter 60 on card, page 211

call KE for plant expansion or new facilities





1,250,000 barrel cement plant addition recently completed by KE for Marquette Cement, one of world's largest cement producers.

has made KE a major engineer-contractor serving the Minerals Industry

Placing of four fully-lined mills in a few hours instead of days—a unique center pier kiln drive —a 2,700' cement transport "airway." With these and many more planned innovations and short-cuts, Kaiser Engineers completed Marquette Cement's Cape Girardeau plant expansion quickly and economically. Construction cost and time were well below industry average.

Mining, transportation, beneficiation, materials handling, processing in cement, gypsum, coal, ferrous and non-ferrous metals facilities—these are but a few of the fields wherein KE serves the Minerals Industries—from economic analysis through start-up.

KE ingenuity—multi-industry experience, keenly applied—can benefit your next facility. Let us show you how.

KAISER ENGINEERS engineers—contractors
Contracting since 1914

Division of Henry J. Kaiser Company • Oakland 12, California • New York, Pittsburgh, Washington, D.C., Buenos Aires, Calcutta, Dusseldorf, Montreal, Rio de Janeiro, Sydney, Tokyo

4367

It's the handiest, most economical power-producing package in its class

NEW 35-kw generator set from Allis-Chalmers

...ANYWHERE

You Can TAKE It Anywhere — One compact, integral unit — engine, generator and switchboard. Only 68 x 25 x 37 in. over-all. Fits easily into a pickup truck or slides from place to place on steel skids. Runs on gasoline or gas.

You Can WORK It Anywhere — indoors or out. Engine is fully protected from snow, dust or rain — generator is weatherproof. Switchboard is cabinet-enclosed to guard against weather, dust, tampering. Set needs no special skill to operate—just connect the load.

You Can SERVICE It Anywhere — It's easy to service this simple, tractor-rugged engine. Even when a complete overhaul becomes necessary, its "wet" removable cylinder liners are low-cost and quickly replaced. What's more, you are never far from a source of original Allis-Chalmers parts.

But You CAN'T MATCH ITS VALUE — ANYWHERE — Compare in on any basis you choose — low invested cost per kilowatt, high economy per kilowatt produced and greatest engine life per dollar. This set has a heavy-duty engine specially built to operate long hours in the steady grind of generator work.

...the G-226 POWER PACKAGE

ENGINE:
Allis-Chalmers industrial POWER-CRATER engine
60 bhp at 1,800 rpm

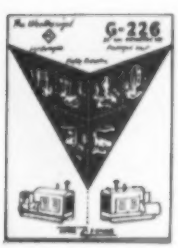
GENERATOR:
3-phase, AC current, 35 kw
Single phase, 23 kw

DIMENSIONS:
68 in. long,
25 in. wide, 27 in. high

WEIGHT:
1,645 lb

A PREMIUM SET AT ECONOMICAL COST!

POWER-CRATER is an Allis-Chalmers trademark.



Let your Allis-Chalmers dealer explain the many other reasons why the new G-226 is the best buy in its class — anywhere. Send for Bulletin BU-412. No obligation. Allis-Chalmers, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

BG-27

Labor Developments

Technological Change

IS a union permitted to strike to try to prevent an employer from making a production change which will eliminate the need for a particular class of workers? This was the issue put before the National Labor Relations Board recently on the ground that the union's action was really an unlawful jurisdictional dispute under the Taft-Hartley Act.

However, N.L.R.B. ruled that that such a strike could continue; it was not illegal. To be a jurisdictional strike, the Board reasoned, it was essential that there be competing groups of employees. In this case, the employees who were to be eliminated were striking not to prevent some other specific group of employees from doing the work, but rather to prevent a change in the method of performing the work. Since this was not proscribed by the law, the strike could continue.

Only the Board chairman thought otherwise. He argued that it was perfectly apparent that other employees would be employed to do the less skilled work. The fact that they were not yet identified made no real difference. Essentially, he declared, this was the kind of situation that the jurisdictional dispute section of the Taft-Hartley Act was intended to reach, and should be interpreted so that this law could reach it; but the chairman was outvoted.

This ruling makes even more timely the advice recently given to its affiliated unions by the parent body, the AFL-CIO, in a recent Collective Bargaining Report. Employers should consider this approach and anticipate its use in connection with the introduction of technological changes.

"Introduction of major new machines—automation or other labor-saving equipment—raises special problems for the workers directly affected."

By S. HERBERT UNTERBERGER

S. Herbert Unterberger and Company
Economists-Consultants on Labor and Industrial Relations
Washington, D. C.-Philadelphia, Pa.

This report examines the approaches used by unions in collective bargaining to handle such problems arising out of major technological change. It indicates briefly what questions are likely to arise and discusses how unions have sought to meet them.

Overall Union Attitudes

Some basic points should be noted about typical union attitudes to technological change.

Unions in the United States are not opposed to and do not stand in the way of technological improvement. They well recognize that technological advance and the resulting increasing productivity are needed to enable improvement in standards of living.

They usually co-operate with and indeed frequently encourage and stimulate management efforts to improve technology. This is well reflected in the fact that, although new equipment costing billions of dollars is installed each year, there are barely a handful of claims or complaints of union opposition.

At the same time, unions want to see to it that workers get wage increases to provide them with a fair share of the benefits of increased productivity.

Unions are also greatly concerned about the manner in which technological change is introduced. They want an orderly procedure for joint management-union consideration of possible adverse effects on workers, and they want efforts made to meet affected worker's problems on a mutually satisfactory basis.

Unfortunately, concern on the part of unions about the manner in which technological change is introduced is sometimes mistaken for resistance to change, when in fact it is not. If a union has not been informed and consulted about a major change or if it finds that worker problems have not been taken into account, it may quite understandably be critical and resentful of the procedure; and it may seek needed corrective steps, although it does not object to the technological change itself.

Unions believe that management has a positive responsibility to soften any blow of new technology on its workers, and that the workers should not be forced to carry all of the sacrifice or burden of adjustment. Measures needed to aid affected workers should be considered as properly a part of the cost of the introduction of new machines. To put it another way, management should devote some of the savings to be gained from introduction of new equipment to the easing of adverse effects on workers.

Union Bargaining Approaches

There is no one set of steps or "protections" equally helpful or desirable for all situations. The measures to be emphasized and the details of needed adjustments will necessarily vary with the individual situation.

Essentially, what most unions have sought in bargaining at the local level to take the sting out of technological change can be summed up as follows:

Advance notice and consultation—Unions want to examine beforehand the changes to be made and the problems which may arise for workers arising out of such changes. They want an opportunity to join

in planning the introduction of the changes in such a way that adverse effects on workers may be minimized or eliminated.

Negotiation on question raised by new conditions—Typical among the basic questions which arise are: (1) the content and classification of new and changed jobs; (2) the wage rates for such new or changed jobs; (3) the selection of workers to fill the new jobs; (4) provision for training or retraining required for the new duties. The goals in such negotiations are that workers should benefit and that their conditions be improved rather than depressed, as a result of the technological change.

Protection for affected workers—For workers whose jobs are taken over by machines, unions want such assurances as (1) first chance at any new jobs created by the change or at other work available elsewhere; (2) protection against wage loss on any transfer or demotion; and (3) for those who must be laid off, severance pay to cushion the job loss.

By and large, this policy statement is couched in the language of sweet reasonableness. There can be little objection to the request for advance notice and consultation. Even the negotiation on questions raised by the new conditions is nothing more than the law requires. The point at which the arrangement is likely to become expensive is in connection with the kind of protection furnished for the affected workers.

Washington News Letter

(*From page* 12)

The heart of this committee's analysis is that the rise in government expenditure is expected to be offset almost entirely by the decline in the rate of expenditures by business for plant and equipment.

And therein lies the difference between the optimists and the pessimists. In a curiously complex manner, in Washington today, an optimist is one who expects the increase in government expenditure to exceed the decrease in business expenditure, thereby giving the economy a shot in the arm; a pessimist expects the opposite. How important government action has become!

Finally, there is the big question, "Will the new models bring the automobile industry out of its doldrums?" The information about those new models that is beginning to filter out is most disappointing. From present indications, the new models will be very much like the old ones—big, shiny, with high horsepower and a healthy appetite for gasoline. There is no doubt that there is a demand for such automobiles. They are being sold now at the rate of about 4½ million a year. In 1957, 6 million such cars were sold.

Without something new to spark the demand, such as perhaps a really good small car that can be operated economically, there is no reason to believe that another 6-million-car year can be achieved soon. If no new development appears, the automobile industry and everyone else will have to learn to live with a recession economy for some time to come.

Change for the Better? Just Might Be—We hope

Despite the prevailing trend of declining sales and lower net earnings, the economic picture is not entirely gloomy. Occasional bright spots are noted which suggest that a return to higher demand and profits might be in sight for the nonmetallic minerals industry.

Pan American Sulphur Company, Dallas, Tex., has reported 1957 net earnings of $3,452,555, or $1.69 a share, a substantial increase over 1956 earnings of $2,112,289, or $1.11 per share. Earnings for the first quarter of 1958 also rose to $760,849, or 36 cents per share, compared with $731,445, or 35 cents the previous quarter. Both production and shipments rose during the quarter—production by 25,000 tons and shipments by 35,000 tons.

Marquette Cement Manufacturing Company, Chicago, Ill., reported a 7½ percent improvement in earnings for the quarter, ended March 31, compared with that of a year ago. Net income for the first quarter of 1958 was $515,746 or 18 cents per common share, against $479,611, or 17 cents per share in 1957. Receipts totaled $6,210,442 for the first quarter of 1958, against $6,016,227 earned in 1957.

Missouri Portland Cement Company, St. Louis, Mo., reported net earnings of $184,693, or 24 cents a share for the January-March quarter, compared with $170,009 or 22 cents a share for the like 1957 period. Net sales in the 1958 period, however, were only $2,163,387 against $2,360,686 last year.

Bestwall Gypsum Company, Ardmore, Pa., reported higher earnings and sales for the first quarter of this year. Net income rose to $641,283, or 87 cents a share on sales of $7,199,095. In the 1957 quarter the company earned $549,715, or 75 cents on sales of $6,582,737.

Several Canadian producers also recorded encouraging signs of a potential comeback north of our border.

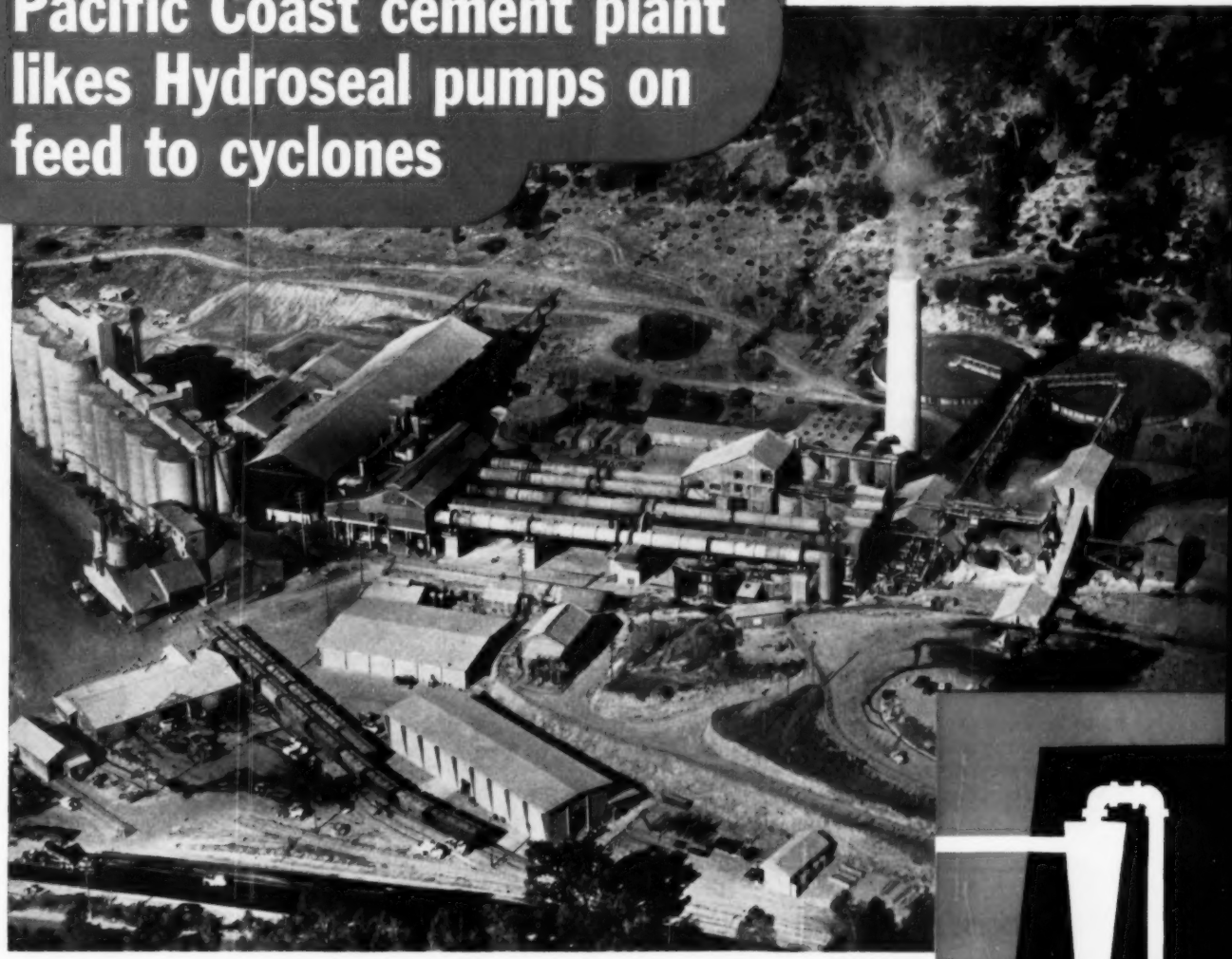
Inland Cement Company, Ltd., Edmonton, Alta., and its wholly-owned subsidiary, Saskatchewan Cement Company, Ltd., Regina, Sask., reported a consolidated net income of $379,993 for 1957, compared with $191,123 in 1956, when Inland was in production for nine months during its first year of operation. Saskatchewan Cement was acquired in 1957.

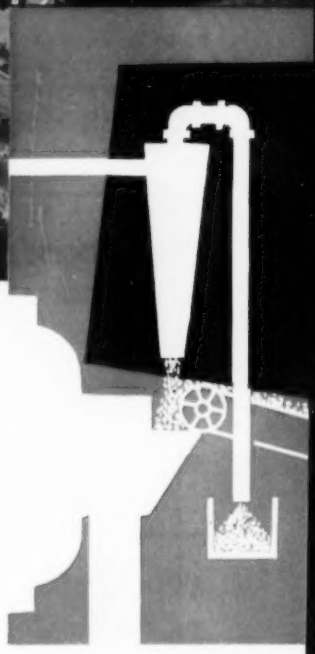
Asbestos Corporation, Ltd., Montreal, Que., reported a net profit of $5,223,191 or $2.90 a share for 1957, against $5,063,121 or $2.81 in 1956. Shipments in 1957 were the highest in the company's history with volume up 8 percent and value 12 percent higher than in 1956.

Canada Crushed and Cut Stone, Ltd., Hamilton, Ont., had a net profit of $419,300 or $2.07 per common share for 1957, a 5.5 percent gain over the $397,531 or $1.95 earned in 1956.

Gypsum, Lime and Alabastine Canada, Ltd., Toronto, Ont., reported the consolidated net profit for the three months ended February 28 was 111 percent higher than the like period a year ago. Earnings in 1958 were $325,000, or 37 cents per share, against $154,000 earned in 1957.

Pacific Coast cement plant likes Hydroseal pumps on feed to cyclones



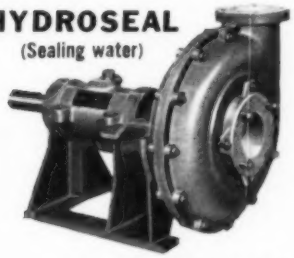


Calaveras Cement Company, in its large plant at San Andreas, Cal., uses BC-6-5 Frame Hydroseal rubber-lined pumps on cyclone feed. Since cyclones do their best with the help of superior pumps, these Hydroseals share credit for the marked success of a closed-circuit fine-grinding system that has effected an increase in production and a decrease in operating costs.

For information about Hydroseal Slurry pumps, write for Brochure No. 457; about Centriseals, which deliver pulp undiluted, specify Brochure No. 557.

INTERCHANGEABLE
Rubber-lined Pumps

HYDROSEAL
(Sealing water)



CENTRISEAL
(No sealing water)

THE ALLEN-SHERMAN-HOFF PUMP CO.
Dept. P—259 E. Lancaster Ave., Wynnewood, Pa.
Representatives throughout the World

HYDROSEAL and CENTRISEAL
SAND, SLURRY & DREDGE PUMPS
MAXIMIX RUBBER PROTECTED

fastest growing acceptance in

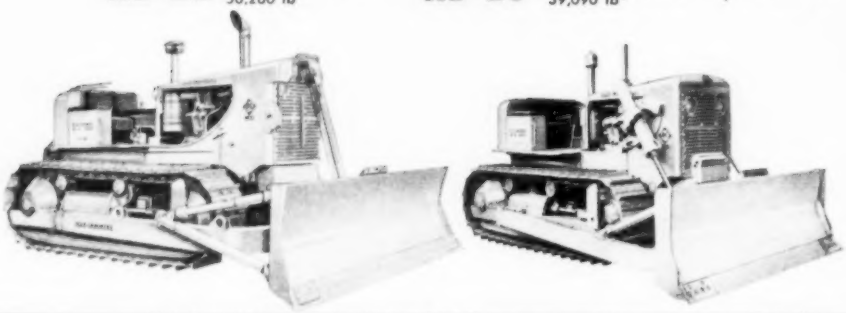
Allis-Chalmers crawler tractors for every application

...plus a complete line of matched bulldozers, side booms, mounted rippers, other attachments.

*All weights approximately as illustrated. Twelve other tractor models available.

HD-21 225 net engine hp, torque converter drive, 56,260 lb*

HD-16 torque converter drive, 150 net engine hp, 39,090 lb* | all-gear drive, 141 belt hp

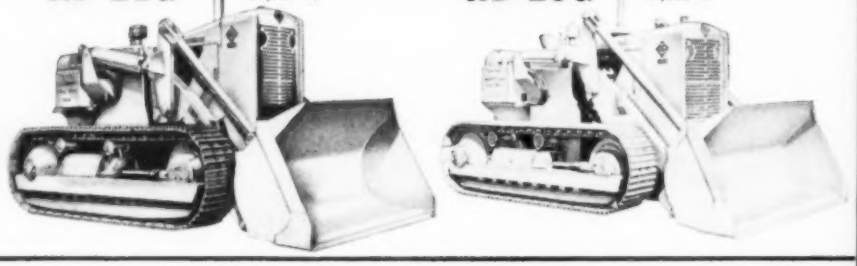


Allis-Chalmers tractor shovels in a full range of bucket sizes...

up to 7-cu-yd capacity to match requirements for various materials and job conditions.

4-CU-YD
HD-21G 225 net engine hp, 66,500 lb

3-CU-YD
HD-16G 150 net engine hp, 47,800 lb



Allis-Chalmers motor scrapers and wagons...

five models that offer major advantages on big jobs or utility work.

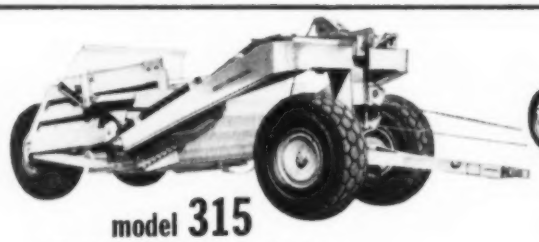
TS-360
280 hp
Struck — 15 yd
Heaped — 20 yd

TW-360
280 hp
Struck — 17 yd
Heaped — 24 yd

TR-260
200 hp
Struck — 11 yd
Heaped — 15 yd

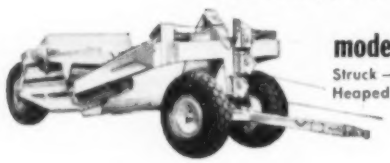
Allis-Chalmers pull-type scrapers...

the only line with low bowl, high apron lift, forced ejection in every size.

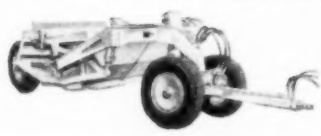


model 315
Struck — 15 yd; Heaped — 20 yd

model 108
Struck — 8.4 yd
Heaped — 12 yd



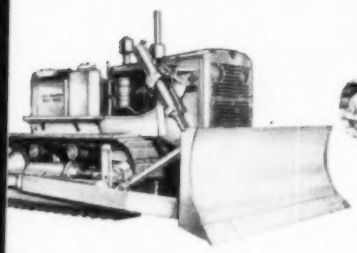
model 106
Struck — 6.1 yd
Heaped — 8.5 yd



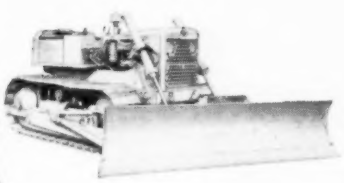
model 44
Struck — 4 yd
Heaped — 5.5 yd

the business . . . ALLIS-CHALMERS CONSTRUCTION MACHINERY

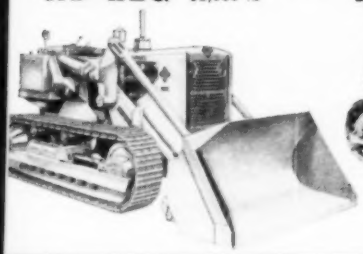
HD-11 94 belt hp 25,960 lb*



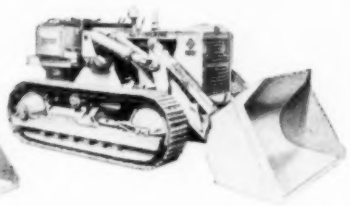
HD-6 63 belt hp 16,470 lb*

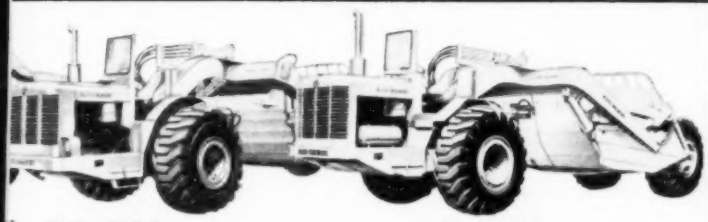


2¼-CU-YD
HD-11G 111 net engine hp 32,000 lb



1½-CU-YD
HD-6G 72 net engine hp 19,600 lb



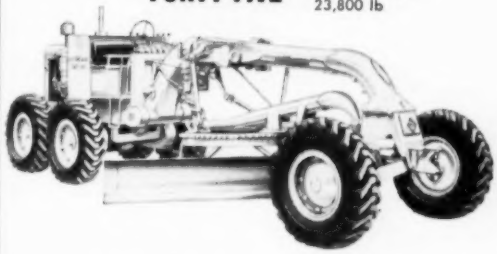


TS-260
200 hp
Struck — 11 yd
Heaped — 14 yd

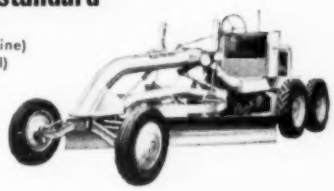
TS-160
155 hp
Struck — 7 yd
Heaped — 9½ yd

Allis-Chalmers motor graders...
designed for comfort-conscious operators and cost-conscious owners.

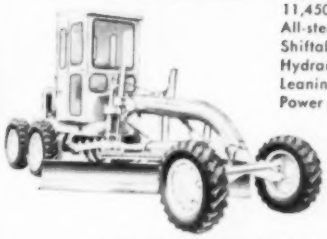
FORTY-FIVE 120 brake hp 23,800 lb



model D standard
50 brake hp
8,800 lb (gasoline)
9,350 lb (diesel)



model D special
50 brake hp
10,900 lb (gasoline)
11,450 lb (diesel)
All-steel cab
Shiftable moldboard
Hydraulic scarifier
Leaning front wheels
Power circle turn



ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION
MILWAUKEE 1, WISCONSIN

DESIGNED AND BUILT FOR HIGH-VOLUME PERFORMANCE YOU CAN DEPEND ON

Look ahead... *move ahead*...and stay ahead with ALLIS-CHALMERS

Maker of Century Maroon Praises Cities Service Green!

"16 Trouble-Free Years with Cities Service Lubricants!"

You've doubtless heard of Century Maroon, Century Pink and Century Tweed.

These are famous colors of granite made into memorials by Century Granite Company, Snyder, Oklahoma.

But if you talk to the people at Century, they'll tell you there's another color that's mighty popular in their operation—Cities Service Green.

Here are some reasons: Cities Service Trojan M-3 Grease, with its natural affinity for water and ability to withstand high temperatures, has proved the ideal lubricant for gang saws. Similarly, jack-hammers and other equipment subject to even more water get the protection they need from Cities Service Neptune 2-Z. The unusual and exacting physical characteristics of this lubricant plus the outstanding emulsifying properties have provided years of trouble-free operation.

"That's the kind of performance we've been getting from all Cities Service products for the past 16 years," reports partner George Verhoff. "Thanks to their protection, our equipment requires minimum maintenance."

Wherever production schedules are tight and profit margins tighter—that's the place for Cities Service fuels and lubricants. Proven moneysavers, these superior products can brighten your maintenance picture, too.

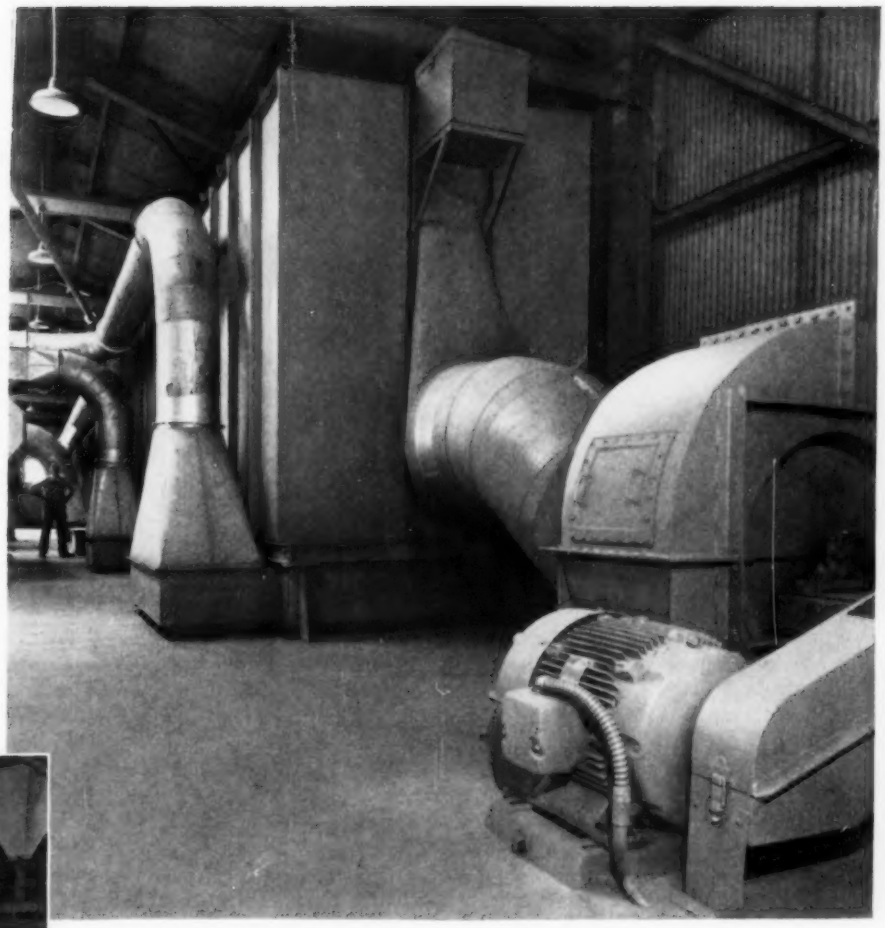
Get the facts from a Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

Gang Saws are lubricated by Cities Service Trojan M-3 Grease, a lubricant specially fortified to withstand heat and water.

90% Of Century's Granite is used for memorials which are distinguished by their famous colors: Century Pink, Century Maroon, and Century Tweed.



New standard of cleanliness is achieved in new refractory plant. Dust is trapped before it can escape, brought to this Dracco Multi-Bag Filter for high-efficiency collection.

Superintendent James E. Coffman of Harbison-Walker Refractories Company's new Hammond, Indiana, basic firebrick plant reports:

Dracco Dust Control keeps our plant *"clean as a home"*

In this new plant, Dracco Dust Control Equipment serves the entire manufacturing line, collecting any dust from crushers, grinders, mixers, screens, silos and handling equipment.

"By recovering the dust," says Mr. Coffman, "we keep the plant as clean and healthful as the average private home. Plant atmosphere is as pure as the air outside. We also gain virtually 100% production out of our raw material investment."

The Dracco system also prevents such dust-caused problems as abrasive wear of machinery, high plant housekeeping costs, reduced efficiency and material contamination. Performance benefits like these have led Harbison-Walker to specify Dracco Dust Control Equipment for many facilities.

For experienced assistance in solving your dust problems, call in a Dracco engineer today. Contact:

DRACCO DIVISION OF FULLER CO.
4050 East 116th Street · Cleveland 5, Ohio

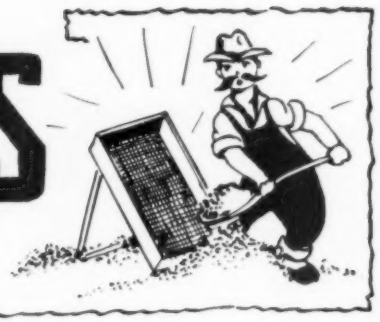
Complete 40-page catalog on Dracco Dust Control Equipment contains detailed data and valuable reference material. Write for Bulletin 800.

DRACCO *airstream* conveyors
dust control equipment

FULLER COMPANY GLOBE-AMERICAN

Enter 69 on card, page 211

SCREENINGS



By RAY L. SMITH JR.

WE NEVER like to start the day's work before we know what's going on in the world. Everything is so tied up with everything else that a feller has got to be careful. An election in Greece can cause a slump on Wall Street, or a street fight in Egypt may call for an emergency Cabinet meeting in Washington. Things are so close knit in the world that we don't want to start plowing up the weeds in one of our fields if it's going to effect somebody in France the wrong way.

The papers have been full of good stuff for quite a while now. Fer instant, we saw recently that a feller in a dental school in Georgia is working on a power-drive tooth brush. We laid awake all last night wondering if it'd have handles on it and you walked behind it, or if you could jump on it and ride. Along about daylight we figgered it out that you could use it in a rocking chair. A great peace came over us and we fell off to sleep.

We also saw an item that Congress has set aside eight million dollars and told the Air Force to "explore" in the vicinity of the moon. Looks to us like they could get closer than that for eight million bucks. Don't see why they didn't make it 10 million and order 'em to hit it on the nose. After all, what's a couple more million?

Then there was an item where Billy Graham wants to hold world prayer to save them thugs in the Kremlin. We're a great believer in prayer when you've got a good cause, but right off hand we can't figure we got the percentages going for us with this one.

But there's one thing we haven't seen in the papers this spring. You don't see kids playing marbles much any more. When we were a boy we couldn't wait for warm weather so's we could shoot marbles.

We can see how Johnny, under this new system of education, would forget how to read, but we can't figure why he'd quit shooting marbles. We was talking to our sweet little bride about it last night and she allowed as how it's because Johnny has gotten to lazy to squat.

WE'VE just returned from our second home in the Florida Keys, and it's interesting to note the many changes that have taken place since the last time we were there.

The first convention hall ever built in the Keys has been completed at Key Colony Beach, second city to be incorporated in Monroe County in 129 years.

Guy Lombardo and his Royal Canadians will soon play "the sweetest music this side of heaven" at Key Colony Beach. Guy has just purchased the Shamrock dining room and cocktail lounge and he'll bring many more along with him.

Eleven acres on Boot Key have been optioned for a radio station.

National chain stores are eyeing Marathon.

The outboard motor boat rage which has swept the nation has brought to the Keys—water skiing—a new and thrilling sport.

Skin diving with aqualungs is a new way to discover beauty and fish that few people have ever seen.

And fishing—from Card Sound and Key Largo, where trout aplenty are to be caught, to Bahia Houda and its hordes of tarpon, fishing is unparalled in the Keys.

We will always return to Marathon with the firm conviction that we've guessed right. This area is ON THE WAY.

Potpourri and Succotash

"I work in the opera at night. In the last act I carry a spear."

"How do you manage to stay awake?"

"The fellow behind me carries a spear, too."

"Am I scared! Got a letter from a man saying he'd shoot me if I didn't stay away from his wife."

"Well, all you gotta do is stay away."

"Yeah, but he didn't sign his name."

A racetrack is a place where windows clean people.

The director was talking in his sleep. "Darling, I love you," he said. "You are my life, my heart. More than anything else in the world. . .

Then he woke up and saw his wife glaring at him. Knowing what the trouble might be he pretended he was still asleep, rolled over and murmured, "Cut! Now bring on the horses."

Uncle: "You boys of today want too much money. Do you know what I was getting when I married your aunt."

Nephew: "No, and I'll bet you didn't either."

"I want to get a corset for my wife."

"What bust?"

"Nuthin. It just wore out."

He was leading a handsome boxer on a new leash when he met a friend. "Look what I got for my wife this morning."

The friend gazed in admiration. "Gosh, you have all the luck. Wish I could make a trade like that."

product:

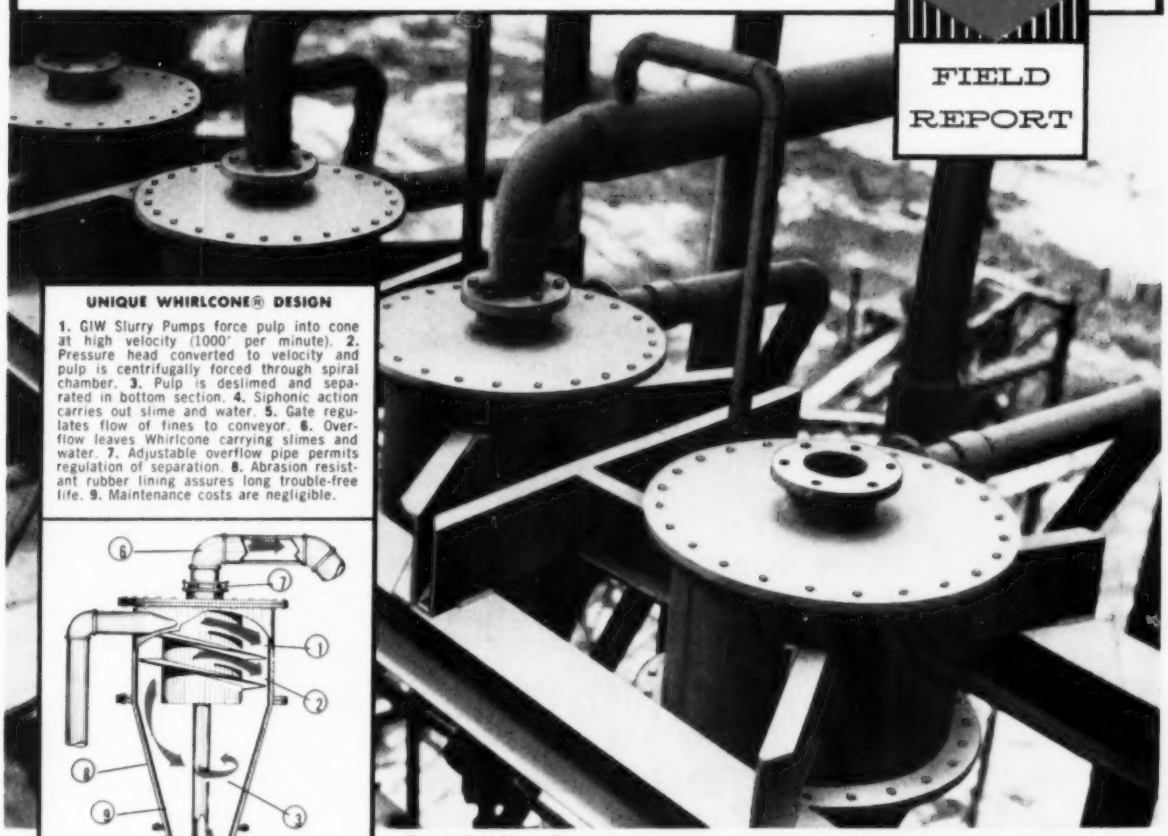
COTTRELL WHIRLCONE® SEPARATORS

customer:

BECKER COUNTY SAND & GRAVEL CO.

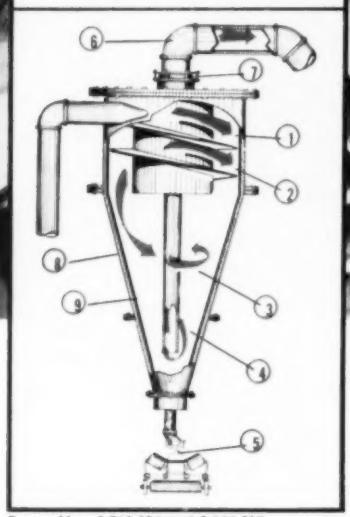
GIW

FIELD REPORT



UNIQUE WHIRLCONE® DESIGN

1. GIW Slurry Pumps force pulp into cone at high velocity (1000' per minute). **2.** Pressure head converted to velocity and pulp is centrifugally forced through spiral chamber. **3.** Pulp is deslimed and separated in bottom section. **4.** Siphonic action carries out slime and water. **5.** Gate regulates flow of fines to conveyor. **6.** Overflow leaves Whirlcone carrying slimes and water. **7.** Adjustable overflow pipe permits regulation of separation. **8.** Abrasion resistant rubber lining assures long trouble-free life. **9.** Maintenance costs are negligible.



Patent Nos. 2,738,070 and 2,806,599

Tough GIW Slurry Pumps feed pulp to these 25" dia. Whirlcones®, which retain fines from classifier overflow. Maximum recovery rate is 20 tons per hour per cyclone. The cones will handle material from −12 mesh to lightest slime.

Whirlcone® Separators solve difficult fine recovery problems.

The retention of fines in the −50 plus 200 mesh range posed a disturbing problem for the Becker County Sand & Gravel Co., of Cheraw, S.C., primarily because the large amount of water used in processing the sand and gravel washed out the desirable fines with the minus 200 slimes.

Fourteen 25" dia. Whirlcone® wet type cyclones installed parallel in four Becker plants solved this problem completely. Operating an average of 8 hours daily, they extract up to 100 tons of clean, fine sand per hour from wash water while the minus 200 mesh slime is discarded.

Recovered fines are used to bring sand up to specifications. Thousands of tons of valuable sand, formerly lost, soon paid for the low cost of the Whirlcones®.

GIW's highly efficient Whirlcones® are also being used in the mining fields to deslime, degrit, classify, concentrate, make dam and mine backfill and to dewater or thicken where the overflow can be returned to the process or it can be discarded.

They are available in diameters from 6" to 50". Capital cost including the pump is 20 to 50% of conventional classifiers.

If you are losing fines from material −12 mesh to lightest slimes, write today. Recommendations and literature will be forwarded promptly.

COTTRELL ENGINEERING
Division of
GEORGIA IRON WORKS CO.

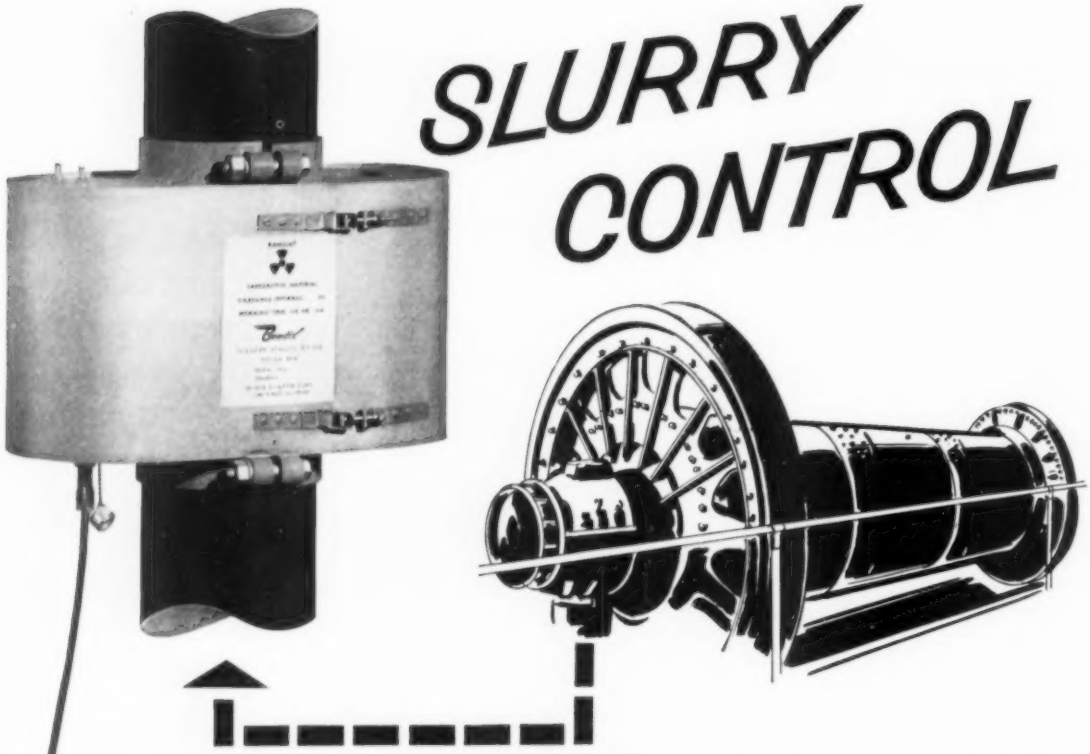
GIW

Manufacturers of pumps, dredges, separators and accessories.

AUGUSTA • GEORGIA

Enter 71 on card, page 211

SLURRY CONTROL



BENDIX NUCLEAR DENSITY GAGE AUTOMATICALLY CONTROLS SP. GR.† OF FEED SLURRIES

†*Specific Gravity*

The fluid content of your slurry can mean the difference between profitable optimum control and costly borderline operation. Down time due to pump failures can be drastically reduced and plugged equipment can be virtually eliminated with the Bendix* Nuclear Density Gage. In processes using kilns to remove water, fuel savings can be realized; where efficient recovery of solids from flue gas or optimum ore separation by Specific Gravity is desired, the Gage can be readily adapted.

Bendix Nuclear Density Gage assures successful processing in metals mining and non-metals mining operations. Control of the fluid or solids content of your slurry can be maintained precisely at any desired point. The measuring element does not contact the slurry, therefore abrasive and corrosive processes can be handled with ease. Control is continuous and automatic.

A complete and accurate record of Specific Gravity is provided as rapidly as the process changes occur. Inadequate sampling techniques and "post mortem" laboratory analyses need no longer be tolerated.

- **Applications: Wet slurries in ball mills, rod mills, flue gas recovery systems, dust collectors, flotation, classifiers, thickeners, etc.**

Bendix furnishes consulting service for every installation. Write for full details to Cincinnati Division, Dept. 430, 3130 Wasson Road, Cincinnati 8, Ohio.

*REG. U.S. PAT. OFF.

Export Sales:
Bendix International, 205 E. 42nd St., N. Y. 17, N. Y.
Canada: Computing Devices of Canada, Ltd., Box 508, Ottawa 4, Ont.

Cincinnati Division

Bendix
AVIATION CORPORATION

"No better rock hauler than Euclid Rear-Dump"

During the month that Fred Hall & Son of Valley Mills earned the largest payment for monthly work ever paid by the Texas Highway Department, 180,000 yards of rock were hauled by their fleet of 15-ton "Eucs". Working 10 to 12 hours per day, three of the six rear-dumps in the fleet fed a crusher for the first half of the month—another team of three R-15 Euclids and second crusher was added for the balance of the month.

The contractor was working on an 8 mile section of U.S. 81 in McLennan County. Fred Hall, Jr. reports maximum availability during the month with regular servicing being the only maintenance required for their 100% Euclid fleet of haulers.

The Model R-15 "Euc" used on this rock crushing job has a rated payload of 30,000 pounds, 10½ cu. yd. struck capacity, 218 h.p. engine, five speed transmission, hydraulic booster steering and 14.00 x 25 dual drive tires.

Fred Hall's experience with "Euc" performance is typical of hundreds of other contractors, mines and quarries—large and small—who have found that Euclids are your best investment. Have a Euclid dealer give you specifications and production data.

EUCLID Division of General Motors, Cleveland 17, Ohio

GM GENERAL MOTORS EUCLID

EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE

Got the Seed of an Idea? Plant it with Crown Multiwall!

- Is it practical to ship waffles in Multiwall Bags?
- Are cottage cheese curds too wet for packaging in Multiwalls?
- Is it economical to ship goose down feather pillows in Multiwalls?

These are just a few of the questions being answered by Crown Multiwall's Specialty Products Department — a unit which takes *your* idea for a new kind of Multiwall, evaluates it, designs a bag to meet the requirements, then field-tests it for trade acceptance.

We're now developing, for instance, a technique which will enable seed inspectors to extract samples from a Multiwall without permanent injury to the bag.

Providing you with a "brain factory" in the form of our Specialty Products Department is one more proof our designers, engineers, and packaging experts are constantly searching out improved methods of meeting your packaging needs.

Plant the seed of your idea with us! We'll do the spade work in trying to turn it into a reality!

Call Crown Multiwall about your packaging problem.

CROWN ZELLERBACH CORPORATION

SALES OFFICES: ATLANTA • BIRMINGHAM • CHICAGO • COLUMBUS • DALLAS • DENVER • HOUSTON • KANSAS CITY
LOS ANGELES • MINNEAPOLIS • NEW ORLEANS • NEW YORK • PORTLAND • SALT LAKE CITY • SAN FRANCISCO • SEATTLE • ST. LOUIS

The Right EXPLOSIVES

Experienced KNOW-HOW

Results PAY OFF

Hercules® Dynamite and Electric Blasting Caps, plus experienced "know-how," made possible these excellent blasting results in a traprock quarry.

Hercules sales-engineers will be glad to assist in selecting the right combination of explosives and blasting methods to meet your particular requirements.

Birmingham, Chicago, Duluth, Hazleton,
Joplin, Los Angeles, New York,
Pittsburgh, Salt Lake City, San Francisco

HERCULES POWDER COMPANY

INCORPORATED

Explosives Department, Wilmington 99, Delaware

XR58-2

Completing two years as president of the group, Emery Durstine, right (The Keener Sand & Clay Co.), is presented with a plaque in recognition of his leadership. Sterling Farmer (Sand Products Corp.) made the presentation on behalf of the association.

N.I.S.A. Spring Meeting

By BUREN C. HEROD

ANOTHER ON THE SPOT REPORT

PURSUANT to an efficient, informative procedure established last year, the 23rd annual session of the National Industrial Sand Association, held at The Homestead, Hot Springs, Va., May 13 to 16, began with intensive committee meetings as a preliminary step to subsequent general group consideration of a number of industry problems.

Along with executive sessions of the group's board of directors, and such association business as election of new officers, several subjects of top priority to this group, as well as to other segments of American industry, were given close attention. Among these were aspects of federal taxation, both current and pending; industry-public relationships in terms of zoning, rehabilitation, and public education programs; and recent activity in *ex parte* proceedings, plus details of the general rail traffic picture.

In addition to association members, program speakers included Professor Ray B. Crepps, Purdue University, formerly director, testing division, Owens-Corning Fiberglas Corporation; John T. Sapienza, Covington & Burling, Washington, D. C., association tax counsel; and Donald Shepherd, Donald Shepherd & Company, Quincy, Mass.

Top association officers elected during this meeting were William J. Cannon (Nugent Sand Co.), president; Arthur B. Schlesinger (New Jersey Pulverizing Co.), vice-president; and James C. Lockwood (Ottawa Silica Co.), treasurer. Mr. Cannon succeeds Emery M. Durstine (The Keener Sand & Clay Co.), who held office as association president for the last two years.

Three vacancies on the board of directors, created through retirements in accordance with constitutional limitation on length of service, were filled by the election of Karl O. Geng (Manley Sand Co.), Arthur F. Harrison (The Ayers Mineral Co.), and C. Franklin Wolf (New Jersey Silica Sand Co.). William Paddison (Great Lakes Foundry Sand Co.) was also elected

Among the top officers and new directors of N.I.S.A. elected during the recent meeting are: William J. Cannon (Nugent Sand Co.), president; Arthur F. Harrison (The Ayers Mineral Co.), director; Arthur B. Schlesinger (New Jersey Pulverizing Co.), vice president; Karl O. Geng (Manley Sand Co.), director; and James C. Lockwood (Ottawa Silica Co.), treasurer. The other two new directors, C. Franklin Wolf (New Jersey Silica Sand Co.) and William Paddison (Great Lakes Foundry Sand Co.) were unavailable for this group photograph.

Reflects Industry's Vigor

to a 1-year term on the board in succeeding Mr. Lockwood. An honorary membership on the board was voted for A. Y. Gregory (Whitehead Brothers Co.).

Preceding the final two days of general sessions, four primary committee meetings, open to all interested members, were scheduled. These were the sessions of the advisory committee on labor, Ralph S. Lebold, chairman; the committee on fineness and grading of foundry sands under W. D. Chadwick, chairman; the committee on taxation, for which Arthur F. Harrison is chairman; and the committee on Navy sand blast specifications, headed by Arthur B. Schlesinger.

A resume of the association's record for the last two years was given by Mr. Durstine in his opening address. Giving credit to various committee chairmen, the retiring president noted that membership has grown substantially, and that the period has witnessed considerable and successful activity in many fields.

Negotiations with the railroads and various commissions directed toward keeping rail rates on an equitable basis were generally successful. Progress was also recorded in relationships with the Congress and certain federal agencies. A joint undertaking with the American Foundrymen's Society was brought to a successful conclusion, and currently the group is co-operating with the Navy and the American Steel Founders Society in an effort to set up satisfactory specifications on sand. Other areas of co-operative activity enumerated include dust control, taxes, labor relations, industrial compensation, and public relations.

For the benefit of those association members interested in establishing a retirement program within their firms, Donald Shepherd described the N.S.G.A.-N.R.M.C.A. retirement plan for which his company was consultant. Advantages

President-elect W. J. Cannon addresses the group upon taking office.

described to the illustrative plan included economy of preliminary investigations and subsequent operation; greater investment diversification; and flexibility to meet varying requirements of individual participant firms, either for a pension trust or a profit-sharing plan.

Current facets of the federal taxation picture were reviewed by Arthur F. Harrison, chairman of the taxation committee, and John Sapienza, tax counsel. Three general areas of activity—legislative, judicial, and administrative—were covered.

In the legislative area, it was noted, the Treasury Department supports the principle of depletion but has asked for specific legislation establishing a "cut-off" point in the processing of certain materials subject to percentage depletion. One of the several bills pending in Congress would allow fiscal year taxpayers to claim percentage depletion—at the 15 percent rate where applicable—from January 1, 1954.

A number of other bills deal with various proposals concerning depreciation, which, almost without exception, have amplification of relief for the taxpayer. Included among these is accelerated depreciation allowable on the cost of used assets to a limit of $50,000. Also pending is an extension of the corporate 52 percent tax rate, and the reduction or possible elimination of the 3 percent transportation tax.

Recent court decisions have largely been in favor of the taxpayers on such points as ordinary treatment processes, bagging, and transport in excess of 50 miles from pit to plant.

In the administrative area, the long-awaited tax regulations have not yet been completed, it was noted, and may not be for some time. A revised Bulletin F (concerning lives for depreciation purposes) is apparently being developed by the Internal Revenue Service despite opposition from several national industry associations.

One of the features of the meeting was a presentation by the public relations committee, Carl Geng, chairman, of a film in color and sound entitled *The Rumor*. Produced by the American Aggregates Corporation, Greenville, Ohio, this movie is gaining a wide reputation for its effective story of the land rehabilitation program followed by this firm.

In commenting on public relations work, Mr. Geng noted that the sharing and discussion of mutual problems can be a big help to all. While the cost of such work is intangible, it is, nevertheless of critical importance; and in order to diminish any adverse effects stemming from industry operations, producers must endeavor to stay ahead of the problem.

A different approach to good public relations was brought out by Gene Mason (Clayton Silica Co.). He indicated that good employee relations are basic to the entire public relations picture, otherwise such efforts as land reclamation are only window dressing. It was emphasized that employees must be sold on being part of the "team." In spending as much time with workers as possible, company executives will have a ready contact with local community problems and attitudes. Since the employees are actually company representatives in their communities, they are effective public relations emissaries. If they are made to feel a close alliance with company problems, they will inevitably dispel a great deal of possible misunderstanding held by local residents.

It was suggested that reclamation starts with good current housekeeping. Other steps recommended included regular meetings with local chambers of commerce as a step toward public education on industry activity. A constant liaison with zoning boards and similar agencies will prove beneficial in establishing equitable zoning regulations, Mr. Mason noted.

A report for the committee on fineness and grading of foundry sands was delivered by committee chairman W. D. Chadwick. This speaker stated that specifications developed by the Steel Founders Society of America have been studied by the N.I.S.A. committee. The foundry group wants the inclusion of specifications on silica flour, and committees of both associations hope to have reached a mutually acceptable position by Fall.

Mr. Durstine emphasized that in view of the trend among foundrymen toward more rigid control—within a couple of points—on gradation, the efforts of the above N.I.S.A. committee are of particular significance to the association.

William J. Woods Jr. (Pennsylvania Glass Sand Corp.), chairman of the traffic committee, reviewed several pertinent developments in transportation legislation and freight rates in the last eight months. By way of background data, Mr. Woods noted that there is currently a surplus of freight cars, and that carriers are not ordering any new units. As of April 1, there was a backlog of orders for only 42,617 new cars. Although car repair programs are being continued in some instances, this effort is not widespread; and on a national basis, the bad-order situation is at an all-time high.

It was pointed out that there is no question of many carriers being found in financial difficulty. Despite higher freight rates, earnings have declined to the point at which, last year, there was only a 3¼ percent return on net railroad investment. A serious consequence noted is the adverse effect upon carriers' programs of service improvement and new equipment investment. For the first time in the post-war period, it is expected that expenditures for improvement will drop below $1,000,000,000 in 1958.

Mr. Woods indicated that, from a transportation standpoint, a highly favorable situation would be the elimination of transportation excise taxes.

With respect to a recent petition of the carriers for freight rate increases, it was stated that these were selective as opposed to a straight percentage basis used in previous *ex parte* proceedings, and that for the first time in many years a distinction was made between types of sand. The carriers requested a 10 percent increase with the minimum of 15 cents per ton for industrial sand, while that suggested for common sand was only 3 percent with the minimum of 10 cents per net ton.

Due largely to efforts of the traffic committee, the railroads amended the tariff to provide for

(*Continued on page* 93)

Preliminary 1957 Nonmetals Reports On Thirteen Eastern States

New Hampshire The value of mineral production in New Hampshire in 1957 totaled $3,109,000, a 10 percent decrease compared with 1956, according to estimates by the Bureau of Mines, United States Department of the Interior. The decline was due primarily to the completion of the Portsmouth Air Base, resulting in a sharp drop in the demand for crushed stone. Sand and gravel continued as the leading mineral produced in the state.

Seven nonmetallic minerals were produced in New Hampshire during the year. Sand and gravel accounted for 64 percent of the total value. Stone production decreased considerably due to completition of the Portsmouth Air Base. Feldspar output increased sharply as a result of higher demand for feldspar in the pottery industry. Total value of mica production increased in 1957 due to increased sales of sheet mica to the government through General Services Administration. Sales of abrasive stones decreased during the year due to lower demand. Estimated value of gem stone production in 1957 was about the same as 1956.

Massachusetts The value of mineral production in Massachusetts in 1957 totaled $24.7 million, only 2 percent less than the peak year 1956, and 12 percent over 1955, the previous high year. The value of clay, and sand and gravel was slightly below 1956, and that of lime considerably less in 1957 than in 1956.

The new highway building programs were slow in getting under way, affecting particularly the output of stone and sand and gravel. Notwithstanding these factors, the output of stone increased 8 percent in quantity to nearly 5.9 million short tons valued at over $14 million.

Crushed basalt and dimension granite, measured by value, were the principal types of stone, followed by crushed granite and limestone. Dimension sandstone and basalt and crushed granite and miscellaneous stone comprised the balance of the State's stone output. Uses for stone included riprap, railroad ballast, concrete, and roadstone, and agricultural purposes. Lime was utilized largely for chemical and industrial purposes and clay in heavy clay products.

Connecticut The value of the mineral industry of Connecticut rose to $15 million in 1957, an increase of 26 percent over 1956. The increased state mineral value was due almost entirely to a 46 percent increase in value of stone production. The market for crushed basalt (90 percent of stone value) was exceptional.

Rhode Island Value of mineral production in Rhode Island in 1957 declined 5 percent compared with 1956. Sand and gravel continued as the most important mineral commodity produced in the state, but decreased 7 percent compared with 1956. Stone and graphite were the only other minerals produced. Valua-

Mineral Production in New Hampshire, 1956-57
(Excerpted from U. S. Bureau of Mines Data)

Mineral	1956 Short Tons (unless otherwise stated)	1956 Value	Preliminary 1957 Short Tons (unless otherwise stated)	Preliminary 1957 Value
Clays	36,320	$ 47,040	29,000	$ 37,700
Gem stones		500		
Mica	330	187,619		
Peat	320			
Sand and gravel	3,862,479	1,822,230	3,900,000	1,985,000

Mineral Production in Massachusetts, 1956-1957
(Excerpted from U. S. Bureau of Mines Data)

Mineral	1956 Short Tons (unless otherwise stated)	1956 Value	Preliminary 1957 Short Tons (unless otherwise stated)	Preliminary 1957 Value
Clays	127,547	$ 213,682	125,000	$ 212,000
Lime open market)	134,248	2,093,195	130,000	1,667,900
Peat	300			
Sand and gravel	10,189,425	9,519,831	9,285,000	9,228,000
Stone	5,441,878	13,752,920	5,851,000	14,066,000

Mineral Production in Connecticut, 1956-57
(Excerpted from U. S. Bureau of Mines Data)

Mineral	1956 Short Tons (unless otherwise stated)	1956 Value	Preliminary 1957 Short Tons (unless otherwise stated)	Preliminary 1957 Value
Clays	337,984	$ 390,295	300,000	$ 400,000
Lime	39,748	609,202	40,000	513,200
Mica, sheet (pounds)	310	2,064		
Peat	22,315	152,450		
Sand and gravel	4,368,727	4,100,666	4,340,000	4,286,000
Stone	[3]4,427,987	[3]6,589,757	[3]4,340,000	[3]9,615,000

tion of stone production remained at about the same level in 1956.

Maryland The value of mineral output in Maryland in 1957 dropped to $39,704,000, a decrease of 2 percent from that of 1956 according to estimates by the Bureau of Mines. The value of stone and cement output dropped 9 percent and 7 percent respectively.

The construction materials—cement, stone, and sand and gravel, showed decreased production during the year following a trend for decreased building activity, particularly during the last quarter. Output of greensand marl, lime and potassium salts also decreased while clay and talc and soapstone production increased slightly during the year.

Delaware In 1957 the value of mineral output in Delaware declined 9 percent compared with 1956. The decline in value of output was due primarily to decreased demand for sand and gravel, with value of production decreasing 10 percent. The production of stone remained about the same as the previous year, while the average value increased from $2.82 in 1956 to $2.99 in 1957.

Maine Maine mineral production value in 1957 was 3 percent less than in 1956, and only 9 percent less than the peak value reported in 1955. A gradual slackening in business accompanied by increased costs of materials, higher wages and prices, and month-to-six-week strikes in the cement and slate industries was the chief contributing factor to decreased production. Output of clays, lime, limestone for agricultural purposes, and quartzite for road construction, however, were higher than in 1956.

Mineral output in Maine in 1957, as in prior years was predominantly nonmetallic, consisting principally of cement, sand and gravel, and stone. Both portland and masonry cements were produced. Stone produced in 1957 included crushed quartzite, dimension and crushed granite, and crushed limestone.

New York According to estimates by the Bureau of Mines, the value of mineral production in New York in 1957 totaled $239 million, a slight increase over the previous year. Leading minerals produced in the State, in order of decreasing value, were cement, iron ore, stone, salt, and sand and gravel. These five minerals accounted for 81 percent of the total value of mineral output.

Nonmetallic minerals continued as the principal minerals produced in the state, accounting for 65 percent of the state total value. Metals and fuels accounted for 29 and 6 percent, respectively. Production and value of cement, the leading mineral produced in New York, decreased as a result of labor disputes which idled the cement plants during the summer. Value of stone output rose 3 percent compared with the previous year.

Production of salt and sand and gravel, two other important non-

Mineral Production in Maryland, 1956-57
(Excerpted from U. S. Bureau of Mines Data)

Mineral	1956 Short Tons (unless otherwise stated)	1956 Value	Preliminary 1957 Short Tons (unless otherwise stated)	Preliminary 1957 Value
Clays	[2]635,550	$ 1,046,520	686,000	$ 1,055,000
Gem stones (pounds)	50	150		
Lime	52,604	580,928	47,000	603,000
Sand and gravel	10,146,905	12,395,221	9,725,000	12,250,000
Stone	6,228,849	13,304,730	5,890,000	12,105,000

Mineral Production in Delaware, 1956-57
(Excerpted from U. S. Bureau of Mines Data)

Mineral	1956 Short Tons	1956 Value	Preliminary 1957 Short Tons	Preliminary 1957 Value
Sand and gravel	1,159,544	$ 966,508	1,005,000	$ 871,000
Stone	82,503	232,503	82,000	245,000
Value of items that cannot be disclosed: nonmetallic minerals		32,725		10,000

Mineral Production in Maine, 1956-57
(Excerpted from U. S. Bureau of Mines Data)

Mineral	1956 Short Tons (unless otherwise stated)	1956 Value	Preliminary 1957 Short Tons (unless otherwise stated)	Preliminary 1957 Value
Beryllium concentrate	12	$ 6,696		
Clays	26,162	23,045	34,200	$ 43,000
Feldspar (crude) (long tons)	22,219	143,495	15,500	98,200
Gem stones (carats)		500		
Lime	11,997	179,162	14,500	186,000
Mica:				
Scrap	114	3,213		
Sheet (pounds)	19,913	146,437		
Sand and gravel	7,196,019	3,085,417	6,875,000	3,157,000
Stone	942,478	2,238,011	867,000	2,325,000

Mineral Production in New York, 1956-57
(Excerpted from U. S. Bureau of Mines Data)

Mineral	1956 Short Tons (unless otherwise stated)	1956 Value	Preliminary 1957 Short Tons (unless otherwise stated)	Preliminary 1957 Value
Clays (including clays for cement)	1,234,860	$ 1,507,749	1,175,000	$ 1,469,000
Emery	12,153	174,032	12,300	189,000
Gem stones (pounds)		2,000		
Gypsum	1,140,187	4,817,353	957,800	4,051,500
Lime	86,737	1,029,996	87,000	1,116,200
Peat	2,900	23,244		
Salt (common)	3,872,777	27,544,908	3,718,000	28,371,000
Sand and gravel	27,814,958	28,721,718	25,270,000	28,090,000
Slate	64,282	943,544	57,900	849,000
Stone (includes limestone for lime and cement)	22,805,494	36,134,765	23,669,000	37,355,000

metallic minerals produced in New York, declined during 1957. Among the nother nonmetallic minerals produced in New York increases in value of output were reported for abrasive garnet, emery, iron oxide for pigments, lime, and wollastonite. Clay, gypsum, slate, and talc declined in value of production. Value of gem stones recovered in New York was estimated at about the same as 1956.

Pennsylvania In 1957 the value of mineral production in Pennsylvania totaled $1,060.7 million, only 2 percent under 1956. Except for 1956, this represented the highest value of output since 1953. In order of value after bituminous coal and anthracite, were portland cement, stone, petroleum, natural gas, clays, and sand and gravel. Nonmetallic minerals accounted for 26 percent and the metals for 1 percent of the Pennsylvania value of mineral output.

Of the nonmetals, 7 showed increases in value in 1957 compared with 1956—iron oxide pigments, lime, mica, slate, stone, pyrites, and tripoli. Portland and masonry cements, clays, sand and gravel, and sulphur decreased in both quantity and value. Portland cement accounted for 51 percent of the total value of nonmetals. Other high-ranking nonmetals in order of decreasing value of production, included stone, clays, sand and gravel, lime, and masonry cement.

New Jersey Mineral production in New Jersey in 1957 total $65 million in value, a slight increase compared with 1956. This increase in value was due primarily to increased output of metallic minerals. Stone, iron ore, and sand and gravel, in decreasing order of value, were the leading minerals produced in the state and accounted for 84 percent of the state total valuation.

Nonmetallic minerals continued as the leading minerals produced in New Jersey in 1957. Eight nonmetallic minerals were produced in New Jersey during the year, four of which—clays, sulphur, magnesium compounds and marl (greensand)—had increases in value of production. Three of the remaining nonmetallic minerals, lime, sand and gravel, and stone, declined in both tonnage and value. Decreased production of these building materials partially reflects the reduced rate of activity in the building and construction industries.

Mineral Production in Pennsylvania, 1956-57
(Excerpted from U. S. Bureau of Mines Data)

Mineral	1956 Short Tons (unless otherwise stated)	1956 Value	Preliminary 1957 Short Tons (unless otherwise stated)	Preliminary 1957 Value
Cement:				
Portland—				
376-pound barrels	49,526,640	$153,505,926	42,347,000	$138,051,000
Masonry—				
376-pound barrels	2,437,168	8,881,539	2,311,000	8,504,000
Clays	4,412,550	23,781,929	4,010,000	22,400,000
Lime	1,443,430	18,282,135	1,440,000	18,475,200
Sand and gravel	14,047,068	21,320,981	12,530,000	20,080,000
Slate	153,824	4,193,559	154,000	4,300,000
Stone	44,912,987	73,830,720	43,000,000	74,130,000
Sulphur (recoverable elemental sulphur) long tons	11,350	386,296	9,400	287,000
Tripoli	1,030	6,650	1,060	6,670

Mineral Production in New Jersey, 1956-57
(Excerpted from U. S. Bureau of Mines Data)

Mineral	1956 Short Tons (unless otherwise stated)	1956 Value	Preliminary 1957 Short Tons (unless otherwise stated)	Preliminary 1957 Value
Clays	651,080	$ 2,213,965	664,000	$ 2,280,000
Sand and gravel	11,194,412	18,238,745	10,055,000	16,977,000
Stone	9,012,323	20,825,024	8,865,000	20,578,000
Sulphur, recovered elemental, long tons	8,972	291,413	10,000	300,000

Mineral Production in Ohio, 1956-57
(Excerpted from U. S. Bureau of Mines Data)

Mineral	1956 Short Tons (unless otherwise stated)	1956 Value	Preliminary 1957 Short Tons (unless otherwise stated)	Preliminary 1957 Value
Cement:				
Portland—				
(376-pound barrels)	15,150,874	$ 46,341,562	15,733,000	$ 49,874,000
Masonry—				
(376-pound barrels)	914,371	3,451,959	856,000	3,356,000
Clay	6,702,531	17,675,504	5,870,000	17,200,000
Lime	2,995,320	40,804,580	3,147,000	40,376,000
Peat	15,509	174,469		
Salt (common)	2,971,702	15,992,765	2,735,000	14,330,000
Sand and gravel	30,199,822	36,146,175	27,500,000	32,600,000
Stone	33,417,662	50,946,715	34,100,000	51,200,000

Mineral Production in Virginia, 1956-57
(Excerpted from U. S. Bureau of Mines Data)

Mineral	1956 Short Tons (unless otherwise stated)	1956 Value	Preliminary 1957 Short Tons (unless otherwise stated)	Preliminary 1957 Value
Beryllium concentrate—pounds	1,349	$ 454		
Clays	1,000,019	1,032,665	985,000	$ 1,033,000
Lime (open market)	512,346	5,925,915	515,000	6,607,400
Marl, calcareous	10,522	12,220	10,500	12,200
Mica, sheet—pounds	396	5,814		
Sand and gravel	7,783,103	9,240,407	10,000,000	12,000,000
Slate	31,894	1,034,858	44,700	1,086,600
Stone	14,081,904	23,075,595	13,650,000	22,300,000

Ohio Total value of the mineral industry in Ohio in 1957 dropped to $374,042,000, a slight decrease (0.4 percent) from 1956, according to estimates by the United States Bureau of Mines. The most

LOOKING FOR A SAFE BUY IN USED EQUIPMENT?

This sign identifies the *safest buy* in used equipment—a "Bonded Buy" offered by your Caterpillar Dealer. Safest because you get a Guarantee Bond of up to $10,000, assuring you of satisfactory performance of all parts when you make a "Bonded Buy" on any used Cat-built machine.

Your Caterpillar Dealer also offers a "Certified Buy" with his written guarantee covering units of any make. Or a "Buy and Try" deal, which carries a written money-back agreement.

For the safest buys in today's used equipment market, see your Caterpillar Dealer today.

Caterpillar Tractor Co., Peoria, Ill., U.S.A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

BEST BUY IN NEW AND USED EQUIPMENT

Enter 82 on card, page 211

Mineral Production in West Virginia, 1956-57[1]
(Excerpted from U. S. Bureau of Mines Data)

Mineral	1956 Short Tons (unless otherwise stated)	1956 Value	Preliminary 1957 Short Tons (unless otherwise stated)	Preliminary 1957 Value
Clays	769,518	$ 2,449,208	738,000	$ 2,670,000
Salt (common)	680,964	3,453,305	643,000	3,477,000
Sand and gravel	5,110,056	10,710,843	5,875,000	11,460,000
Stone	6,579,271	10,765,639	6,658,000	10,829,000

notable decrease in value of production was in the sand and gravel industry, dropping 10 percent below 1956.

In addition to the decreased activity in the sand and gravel industry, the clay, lime, salt, gypsum, stone, and abrasive stone industries showed a slight decrease in value of production in 1957. Portland cement was the sole nonmetallic mineral industry showing increased activity (8 percent in value of output) during the year; but, its companion industry, masonry cement, followed the statewide downward trend. General industrial comments attested to slackened activity in home construction while road building activity continued at virtually the same pace as preceding years.

Virginia The value of Virginia mineral production in 1957 again topped all prior years and totaled $226.6 million, or 9 percent greater than the next highest year 1956.

Coal, sand and gravel, portland cement, and kyanite established new highs in 1957 in both quantity and value of output. Production of portland cement was 15 percent higher in 1957 than in 1956, that of sand and gravel 28 percent higher and kyanite was more than one quarter greater. Other mineral commodities with moderately higher values of output than in 1956 were aplite, masonry cement, natural gas and slate. The values for hydraulic lime (cement), clays, lead, pyrites and titanium concentrate (ilmenite) remained substantially the same as in 1956. Quantity and value of stone produced in 1957 was only 3 percent less than in the peak year of stone output, 1956. Included among commodities for which decreases in value of output were recorded in 1957 were feldspar, gypsum, lead, manganese (35 percent or more Mn), silver, soapstone and zinc.

West Virginia According to estimates by the United States Bureau of Mines value of the mineral industry of West Virginia in 1957 increased 7 percent, totaling over $1 billion for the first time.

Increased value marked each nonmetallic mineral produced, with the exception of lime and recoverable sulphur which decreased 7 and 29 percent, respectively. The construction industry in West Virginia did not follow the trend of some neighboring states as it showed signs of increased activity. The most significant increases in value of production were in industries closely allied to construction as portland and masonry cement increased 21 and 52 percent, respectively, and sand and gravel increased 7 percent. Other nonmetallic commodities were produced at a rate only slightly above the preceding year.

Great Lakes Carbon Corp. Named Huntley Sales Agent

The Mining and Mineral Products Division of Great Lakes Carbon Corporation has become the sales agent in the United States and Canada for clay, talc, pyrophyllite and other products of Huntley Industrial Minerals, Inc., as of May 1, 1958.

Announcement of the new sales agreement was made jointly by Wright H. Huntley, president of the Huntley firm, and DeOtis L. Marlett, vice-president of Great Lakes Carbon, and general manager of its Mining and Mineral Products Division, headquartered in Los Angeles.

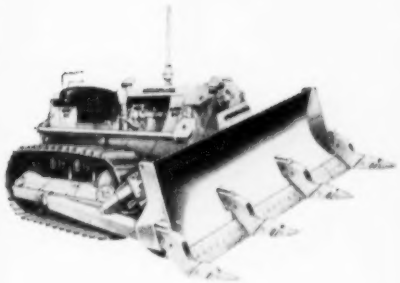
Huntley Industrial Minerals, Inc., whose operations center around Bishop, Calif., owns and operates several deposits of high-grade, nonmetallic minerals, principally kaolin clay, talc, and pyrophyllite. Mining and development work on other nonmetallic minerals is under way.

Enter 83 on card, page 211 ➔

D7 Stockpiles 2,500 Tons of Gravel a Day

"and you seldom see it in the shop!"

NEW! CAT No. 7G BULLDOZER!



Blade tilts 3′ to either side, tips through 16½° arc, slices through hard materials. Teeth pick up and carry. Call for an eye-opening demonstration right on your job!

Gravel Contractor R. J. Jager of St. Paul Park, Minn., turns this Caterpillar D7 Tractor loose whenever he needs fast production. In the photograph above it's stockpiling sub-base gravel from a crusher conveyor pile. Five trucks haul the gravel to the paving roadway, so the D7 stays busy all day. In 10 hours it 'dozes 2,500 tons, and does it day in and day out.

"You seldom see it in the shop," says Mr. Jager. "It's very dependable. Right on top of the heap. That D7 with a 'dozer is an ideal combination around a crusher operation. Not only does it stockpile our entire output, but it works down in the pit where rubber-tired units bog down. Does a host of other 'dozing jobs, too, that make it a very important machine around here."

Superior construction is the reason you seldom see big yellow Cat track-type Tractors in the shop. Example: the exclusive Caterpillar oil clutch—enclosed in a dust-proof housing—practically eliminates clutch adjustments and replacement. Example: fuel injection valves are permanently sealed; they're interchangeable, they can be installed individually without adjustment; and their single orifice nozzle resists clogging. Example: tight-fitting seals and gaskets keep dust and abrasives out of lube oil, fuel and coolant.

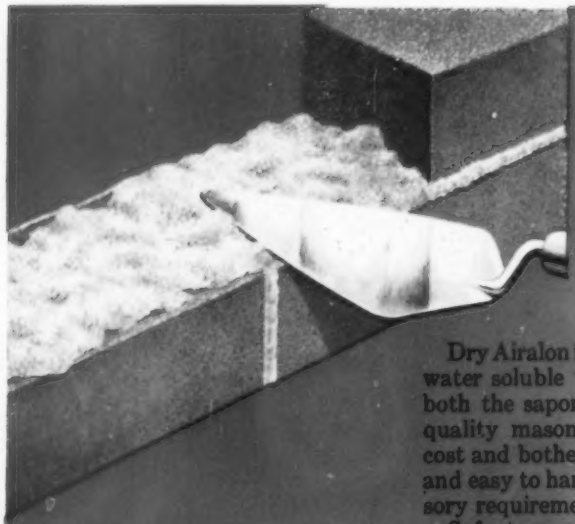
Call your Caterpillar Dealer and let him show you, on the toughest job you can find, why Caterpillar track-type equipment means steady production at low cost.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

FOR MINING'S TOUGHEST JOBS



FOR HIGH-QUALITY MASONRY CEMENT DRY AIRALON

Dry Airalon is a highly efficient mixture of resin and fatty acids in convenient, water soluble "dry-chip" form. It contains, in one ready-to-use compound, both the saponified resin acid and fatty acid required to manufacture high quality masonry cement. "Two-in-one" Dry Airalon thus eliminates the cost and bother of proportioning these two materials separately. Inexpensive and easy to handle, it further helps maintain cost control by reducing supervisory requirements as well as plasticizer costs.

Safe to use because it requires no causticization, Dry Airalon can be counted on to provide consistently uniform air entraining effectiveness. It makes possible greater plasticity and water retention at a given air content . . . or greater strengths at a given plasticity and water retention.

New Task Force

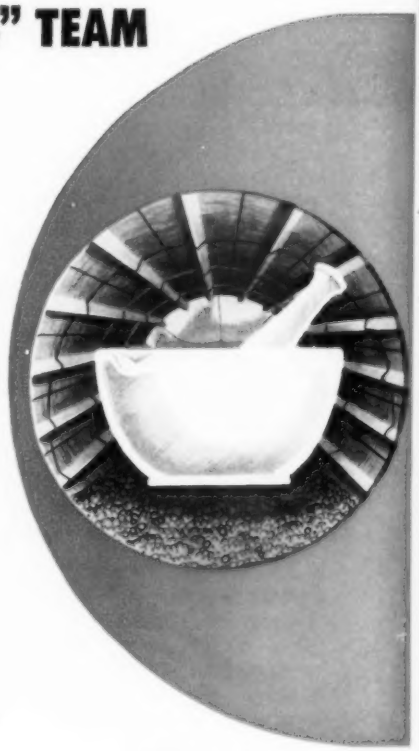
OUR "ROCK PRODUCTS CHEMICALS" TEAM

Dewey and Almy—long a leading name in rock processing products—now offers you the coordinated resources of its new "Rock Products Chemicals" team of chemists and engineers.

This team is at your service with information gained through practical field experience and laboratory research. Whether your immediate need is for grinding aids . . . air entraining agents . . . retarders or plasticizers . . . these skilled specialists offer you both the product and the know-how.

Dewey and Almy basic research brings constant improvements in the efficiency and versatility of chemical additives. The Rock Products Chemicals group translates these developments for your own use . . . and will spur *new studies* to meet your specialized needs.

To get details on how this new concept in rock processing products technology can serve you, write:



W. R. GRACE & CO.
DEWEY AND ALMY
CHEMICAL DIVISION

CAMBRIDGE 40, MASS. • MONTREAL 32, CANADA • CHICAGO 38, ILL. • SAN LEANDRO, CALIF.

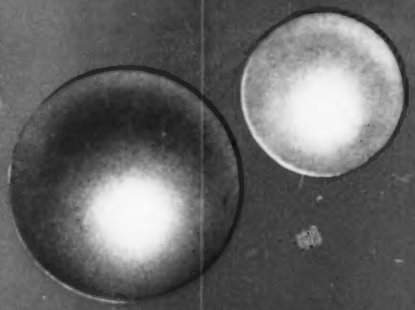
FOR LOW-COST AIR-ENTRAINING CEMENTS

DRY AIRALON

When low-cost air-entraining cements are the order of the day, Airalon is the answer. This multi-purpose compound, easily added as a solution or a dry compound, simplifies inventories, proportioning and handling. Dry Airalon is specially processed in coarse, chip-like form to eliminate hanging-up in feeder bins or hoppers, and permit easy proportioning by means of dry feeders. Dry Airalon "chips" are shipped in protective polyethylene-lined bags—double protection against warehouse caking.

Accepted by ASTM for use in making air-entraining cement in accordance with ASTM C-175, Dry Airalon requires no causticization.

to Serve You



FOR GREATER RETURN ON GRINDING MILL INVESTMENT

TDA and MTDA

Get ready now for the heavy seasonal demands to come. TDA and MTDA, Dewey and Almy's twin grinding aids, can increase cement mill output by as much as 50% . . . without additional overhead, *without additional investment in plant capacity!* Seasonal bottlenecks can be broken with TDA and MTDA. And those *added* barrels of cement, available at the time of heaviest demand, can be the most profitable you ever produced.

In closed circuit grinding, too, TDA and MTDA often provide corresponding benefits. Here, cumulative economies result from substantial grinding assistance, reduced "hanging-up" in the separators, and greater separator efficiency.

While TDA and MTDA are most efficient where ball coating conditions exist, their benefits are considerable even when grinding media are clean. Doubt it? Write us for itemized breakdowns of cost.

N.L.A. convention stresses lime-soil

speakers also discuss lime in high-pressure-cured products, pulp and paper industry; strategic import of missiles, satellites; lime mortar problems

By WALTER E. TRAUFFER

THE National Lime Association's 50th annual convention, held May 12 to 14, 1958, at the Grand Hotel, Point Clear, Ala., was one of the most successful in its history from the standpoint of attendance and the high caliber of the program. Again the keynote was the development of new markets, with special emphasis on the use of lime for stabilization of soils in highway construction. This market has grown rapidly in the past year and promises to become one of the most important outlets for lime. On the program also were papers on the use of lime in high-pressure-cured building products and in pulp and paper manufacture. Other speakers discussed the commercial and strategic potential of limestone mines, missiles and satellites, lime mortar problems, etc.

The location selected for this meeting again was a happy choice. The combination of a top-flight resort hotel with a wide variety of activities from golf and surf bathing to sightseeing had something for everyone. Included was a tour for the ladies through the world-famous Bellingrath Gardens near Mobile and the beautiful homes and gardens in that historic city. The cocktail receptions, an outdoor Seafood Jubilee, and the annual banquet were also very enjoyable. In the annual men's golf tournament Paul F. McCarthy Jr. (Linwood Stone Products Co.) was the winner.

Officers' Reports The meeting was opened with a brief address by President M. A. Rikard (Southern Cement Co.), in which he gave a general picture of the activities of the association during the last year, and of the future.

Treasurer Paul Sunderland (Ash Grove Lime & Portland Cement

The officers of N.L.A. include, left to right: Paul Sunderland, treasurer; M. A. Rikard, president and chairman of the board; Robert S. Boynton, general manager.

New directors of N.L.A. include: Paul F. McCarthy Jr. (Linwood Stone Products Co.); W. H. Price II (Gibsonburg Lime Products Co.); and George Ziegler (M. J. Grove Lime Co.).

stabilization, limestone mines as shelters

Co.) gave the annual financial report, which showed the association to be in a highly solvent condition.

In reporting on developments during the last year, Robert S. Boynton, general manager of N.L.A., said that these could be viewed with "mixed emotions." There was a sharp decline in the demand for lime but the association has never been stronger. Several new member companies added during the year meant that over 90 percent of the tonnage capacity in the United States and Canada is now represented by the association. The budget is the highest in N.L.A. history since the 1920's.

According to Mr. Boynton, the lime industry in 1957 suffered the sharpest decline in business since World War II. There are several disturbing factors such as the growing practice of recalcining carbide sludge, paper mill sludge and city water treatment sludge, the trend toward metal buildings, etc. To combat these factors, the industry must depend heavily on lime-soil stabilization, which has a tremendous potential.

Election of Officers At this meeting all officers were re-elected for another year, including M. A. Rikard, president and chairman of the board of directors; Robert S. Boynton, general manager; Georgia M. Coffman, assistant secretary; and Paul Sunderland, treasurer. John M. Junkin (Warner Co.) was elected to the newly-created offices of vice-president and vice-chairman of the board. All members of the executive committee were re-elected, and four new directors were elected.

District 4—George A. Ziegler (M. J. Grove Lime Co.)

District 5-A—W. H. Price II (Gibsonburg Lime Products Co.)

District 9—Paul F. McCarthy Jr. (Linwood Stone Products Co., Inc.)

Districts 10-11—Alan B. Cheney (Cheney Lime & Cement Co.)

Safety Contest At the meeting a preliminary report of the 1957 Bureau of Mines safety contest was given by Kenneth A. Gutschick, manager of technical services of N.L.A. A total of nine plants had accident-free records in 1957, compared to 17 in 1956. These will receive N.L.A. Certificates of Achievment in Safety at the Fall Operators meeting. These plants, representing three of the four plant classifications, are:

Two of the featured speakers: Russell W. Hunt (Southwest Lime Co.), and Col. H. H. Northington, U. S. Engineers, Redstone Arsenal.

An interested group around Rudolf C. Valore Jr., of Texas Industries, Inc., included Wallace Wing (Marblehead Lime Co.); John S. Wheeler (Ontario Building Materials, Ltd.); Conard M. Kelley, N.L.A.; John M. Junkin (Warner Co.), new vice-president of N.L.A.; John Deely (Lee Lime Corp.); and John L. Minnick and W. J. Nice (G. & W. H. Corson Co.).

W. H. Taylor Jr., Louisiana Highway Dept., one of the speakers, with Alan Cheney (Cheney Lime & Cement Co.) and Dave Shearer (Southern Cement Co.).

Class A1—*Quarry with calcining plant, over 100,000 man-hours.*

Ash Grove Lime and Portland Cement Co., Galloway plant, Galloway, Mo.—374,317 man-hours

U. S. Gypsum Co., New Braunfels, Tex.—267,472 man-hours

National Gypsum Co., York, Pa.—167,956 man-hours

Jones & Laughlin Steel Corp., Blair Limestone Div., Millville, W. Va.—140,189 man-hours

Class B—*Underground mine with lime plant*

National Gypsum Co., Kimballton, Va.—353,252 man-hours

Class C—*Calcining plant only*

Dow Chemical Co., Ludington, Mich.—103,553 man-hours

Mississippi Lime Co., Peerless Vertical Plant, Mo.—82,000 man-hours

Ash Grove Lime & Portland Cement Co., Springfield, Mo.—80,443 man-hours

Tiger Brands Division of Basic, Inc., Buffalo, N. Y.—69,857 man-hours

According to Mr. Gutschick, two plants reached the 1,000-day mark: The Mississippi Lime Co. at St. Genevieve, Mo.; and the Blair Limestone Co., at Millville, W. Va. In April, he said, the 3,000-day mark was passed by the Springfield, Mo., plant of the Ash Grove Lime & Portland Cement Co.

Research Program N.L.A.'s research program was also described by Mr. Gutschick. This included work going on at several universities on acid neutralization, lime stabilization, etc. He told of a new research program to be conducted at the University of Illinois, which will study the effects of adding lime to clay and clayey soils. An experienced highway engineer has accepted a scholarship, and this work will be done under the supervision of a professor who is a leading authority on clay mineralogy. The aim is to develop, if possible, a quick method of determining the reaction of soils with lime.

N.L.A. Movie on Stabilization Lime stabilization, as a large potential market for lime, was prominent on the program. Several reports and papers were given, but the real feature was the premiere of N.L.A.'s new 16-mm. color-sound movie, *Lime Stabilization of Roads,* which gives a brief description of the history and production of lime and its various uses. It shows how lime is used for road bases and shoulders, parking lots, airport runways, city streets, etc. Also included are the actual construction of various types of roads in several states, using both the dry and slurry methods of application.

This excellent film, a professional job in every way, was produced largely by the association's staff. It should be a great help in promoting lime-soil stabilization. This film is available to N.L.A. members.

Promotional Program The N.L.A. Lime Stabilization Promotional Program was described by Conard M. Kelley, highway engineer for the association. He told of the unlimited possibilities for lime stabilization, which promises to make roadbuilding history. Some idea may be gathered from the fact that 6,500 tons of lime was used at one military post. Mr. Kelley said that in 1957 he

Left: John Thornton, consulting architect, and Gen. Louis W. Prentiss, American Road Builders Assn., presented important addresses.

Right: Amos B. Miner (National Gypsum Co.); Ralph L. Dickey (Chemstone Corp.); and Conard M. Kelley, N.L.A.

Warehouse docks with 15-car capacity in the worked-out limestone mining area of the Southwest Lime Company's operation near Neosho, Mo.

traveled 90,000 miles selling lime stabilization, and that this process is now being used or tried out in many states throughout the country.

According to Mr. Kelley, there have been a few setbacks; but there were reasons for most of these, and much has been learned. Most problems have been due to bad construction procedure, severe weather conditions, etc. He emphasized that more research is necessary, as are also salesmen with some technical knowledge. Few states now test their soils, and it might be advisable for producers to pay for such tests.

Stabilization in Louisiana W. H. Taylor Jr., materials design engineer for the Louisiana State Highway Department, said that lime was first used in Louisiana to condition soils so that they could be stabilized with cement. The first actual lime stabilization was done in 1955, and much has been learned since that time. It has been satisfactory, except in a few cases where mistakes in procedure were made. An added advantage of using lime is that rains do not affect stabilized road bases, making it possible to complete projects more rapidly.

According to Mr. Taylor, many laboratories and states are working on stabilization research, but he questions whether they are pursuing all important angles. Users of lime are doing much research, but he feels that the association should undertake a broader program. He stated that the Louisiana highway department is also doing research, but that it is handicapped by lack of information on the work of other states, etc. Mr. Taylor suggested that co-ordination of this work by N.L.A. would mean better results more rapidly.

Potential of Limestone Mines One of the most thought-provoking papers presented was one by Russell W. Hunt of the Southwest Lime Co., Neosho, Mo., entitled *Limestone Mines—Their Potential Commercially and Strategically*. Mr. Hunt, as many of our readers know, is the foremost exponent of the necessity for developing underground shelters and storage space to make possible our survival in case of an atomic war. The worked-out sections of his own mine have been converted for such use and are now used to store various materials, some of strategic importance. Mr. Hunt, a graduate mining engineer, has not confined his efforts to his own operations and profit, however, but has spent considerable time, effort, and money in trying to sell this idea to other producers, the government, etc. He has given numerous talks before producer groups, and his operations have been written up repeatedly in these pages and elsewhere.

The development of atomic and hydrogen weapons has made war so destructive that our entire concept has had to be radically revised. Nuclear warfare could conceivably destroy up to 50 percent of the entire population and our industrial plants and, he pointed out, so contaminate raw materials that construction and repair would be delayed indefinitely. "The protection of the home front no longer rests with the soldier in actual combat. The battle will be won at home with the most careful kind of protection against missiles." This should be sufficient justification for some program to develop shelters, but in the meantime Mr. Hunt urged producers to consider the commercial pos-

The truck-loading dock and underground terminal offices of the Southwest Lime Company.

Ross Worthington and J. W. Gilbert (a convention speaker), both of the International Paper Co.

sibilities for underground warehouses. Properly prepared, these could readily be converted to strategic use whenever necessary.

The Southwest Lime Co., Mr. Hunt stated, began drift mining high-calcium limestone in a Keokuk ledge of the Mississippian system in 1943. This ledge rests on a Grand Falls chert with a clean break, which results in a more or less natural even floor. The mine ceiling varies from 22 to 27 ft., with a clean break at ceiling level. The dense stone cover varies from 40 to 100 ft. in thickness. Temperatures are moderate all year, and there is no water problem.

When it was decided to prepare the mined-out area for commercial use, the first step was to get a fire insurance rating. The resulting building insurance rate on general storage of .067 cents per $100 is said to be the lowest in the country. Now, two years after work was begun, the company has 600,000 sq. ft. ready for occupancy, with more available later. This space is divided into rooms or areas of 55,000 to 75,000 sq. ft. each, separated by 8-in. reinforced concrete division walls with approved fire doors. Exhaust fans take care of bad air or gas in case of fire. There is a complete sprinkler system connected to a reservoir and deep well water supply. Humidity is controlled, and the walls and ceilings are painted white for maximum visibility and appearance. There are railroad docks for loading and unloading at boxcar floor level.

Mr. Hunt made a number of suggestions as to ideal conditions for either commercial storage or manufacturing operations. First in importance is accessibility to a railroad and good highways. Electric power is essential, with a stand-by power plant in case of emergency. A sprinkler system will help to get the best type of business, and controlled humidity is also important. A good, dense stone ceiling is necessary to carry the load of a lighting and sprinkler system. Drift mines are preferable as there is no delay or expense of elevating through shafts. Protection from high water flooding is essential, either by natural drainage or adequate pumping facilities.

According to Mr. Hunt, it has been suggested that the government undertake a subsidized mine program to provide protection against thermonuclear activity, this aid to be available on a few hours' warning for the protection of people. It has been suggested that about 2 billion sq. ft. would be needed to shelter from 50,000,000 to 100,000,000 people. Such a program, he said, would not only be expensive, but time-consuming also. It would be much cheaper and better if by means of a comparatively small subsidy to the mining industry present unused mine space could be converted to such use and future mining carried on in such a way as to create suitable underground space in the desired condition. The subsidy should also be sufficient to induce a considerable percentage of open-pit operators to go underground. Many are already faced with this decision due to increasingly heavy overburden, the growing scarcity of accessible deposits, etc.

In the meantime, Mr. Hunt emphasized that all mine operators should realize that their mines are potentially valuable. They should do at least the cheap and easy things necessary to create more mine space and to preserve that which is now available. The government, on the other hand, should be helping with technical information and realistic planning, pending the formation of a definitive defense program. In closing, Mr. Hunt invited producers to visit his installation.

Highway Program The title *Status of the Highway Construction Program* does not fully describe the subject matter of a paper presented by Major General Louis W. Prentiss (retired), executive vice-president of the American Road Builders Assn. This speaker first mentioned the rapidly growing demand for lime in highway construction, which should make it one of the major markets for the industry. In addition to the increasing size of the highway program, the shortage of good road material in many sections of the country is becoming continually more serious. Transportation costs become prohibitive when suitable base and sub-base materials have to be moved any great distance. This fact should lead to an increasing utilization of mechanical, chemical, and additive means of beneficiating otherwise unsatisfactory road and runway materials. The use of lime as an additive has been successful on all types of road bases and sub-bases from farm-to-market roads to interstate freeways, said General Prentiss, but he feels that the greatest future for its use lies in the secondary road program. This, while not as glamorous as the 41,000-mile interstate system, offers a tremendous potential for the use of lime as a stabilizing agent.

General Prentiss reviewed some of the more important features of the 1956 Federal Aid Highway Act, and outlined its deficiencies. The new cost estimates early in 1958 emphasized the inadequacy of the act, making it apparent that the objectives set forth in it were in-

compatible with the means made available for their accomplishment. The 1958 Act, he said, corrects the major deficiencies of the 1956 Act for the fiscal years 1959 and 1960, but it does not solve the long-term financing problem. This must be done by additional corrective legislation within two years.

The 1958 Act will be immensely helpful to state highway departments and a real shot in the arm to the entire highway industry, General Prentiss declared. It will mean a sharp step-up in expenditure of highway funds in 1958 from $6.3 billions to $6.6 billions and in 1959 to $7.5 billions. The obligation of funds for new construction contracts in 1958 will be stepped up from $3.4 billions to $4.55 billions. This action will result in a sharp increase in orders placed in 1958 by contractors for materials, services, and equipment, largely for 1959 delivery.

High-Pressure Steam Curing In a paper entitled *The Use of Lime in High-Pressure-Cured Building Products* Rudolf C. Valore Jr., research director, Texas Industries, Inc., Dallas, Tex., stated that sand-lime brick, once popular here and still widely used in other countries, would still be popular here if the proper manufacturing procedures had been followed. In order to get a better finish, manufacturers used too fine aggregates, a practice which resulted in excessive shrinkage. Texas Industries, he said, is now making a product using a mixture of lime and cement and is working toward a higher percentage of lime. The drying shrinkage of such a product, said Mr. Valore, can be reduced to an acceptable level.

For such products, both the lime and the pozzolan materials used must have certain characteristics as some of them react differently in autoclaving from the reaction in ordinary curing. During the cement strike last year 120 lb. of cement in a mix was replaced with 50 lb. of lime, and the same quality of block was made at a lower cost. A high-calcium hydrate, he said, works well with lightweight aggregates and can be put direct into an autoclave. With heavy aggregates, a 2-hr. preset period is necessary. According to Mr. Valore, little work has been done on the drying shrinkage of lime, but results obtained have been promising.

In closing, Mr. Valore asked why someone doesn't produce a low-alumina cement for autoclaved products. A blend of cement, lime, and silica would be good and it could be used with any type of aggregate. This combination, he said, would be particularly valuable to the small producer who has, perhaps, only one autoclave.

Lime Mortar *Something Else May Be to Blame* besides the lime mortar when trouble is experienced with a masonry job, according to John Thornton, consulting architect, Detroit, Mich. He had addressed this group several years ago on the need for more research on lime mortars. At that time a search was made for a better mortar, and it was found that most of the trouble with masonry was due to the surface of the brick used. This experience, Mr. Thornton pointed out, made him realize that to understand a problem one must go below the surface and find the hidden facts.

Mr. Thornton described some of the problems he has been called on to solve. In one case, a lime stain on brick seemed impossible to remove until someone suggested using a blow torch. In another, cracks developed in the top floor of a nurses' home. It developed that this floor had not been used or heated in its first year, and the expansion and contraction of the roof steel was responsible for the cracks. In one area there had been no plaster trouble in homes, but suddenly cracks appeared on all the walls and ceilings. It was found that the rock lath was wet on the edges, and this caused expansion and cracking.

On the brick walls of an underpass the lime-cement mortar failed. It was found that during construction the wind hit one wall and dried it out. Spraying for a few days corrected this condition. In another case described by Mr. Thornton the walls of a new high school building leaked. It was found that the edge of a steel plate, which was put in before settling was completed, had broken loose, allowing water to go through.

In closing, Mr. Thornton said that it is easier to blame a material than to find a reason. He pointed out that lime paint on wood is an excellent fire retardant, and that lime can be used for stabilizing under concrete slabs laid on the ground.

Lime in Paper Manufacture *The Role of Lime in Pulp and Paper Manufacture* was described by J. W. Gilbert, director of research, International Paper Co. Lime is used for causticizing, leaching, and water softening. In this process, calcium-carbonate sludge is settled out, filtered, and calcined for further use. Normally 95 percent of the lime is recovered, and the loss is made up with fresh lime.

Missiles and Satellites A very interesting feature of the program was a talk on *Missiles and Satellites* by Col. H. H. Northington, deputy chief, U. S. Engineer's Office, Redstone Arsenal, Huntsville, Ala. He told briefly of the work being done on missiles and satellites from both military and scientific standpoints. We are now, he said, in about the stage of progress that airplanes were at the end of World War I. A 15-minute film on Army missiles showed the preparation and launching procedures used.

B.C. Lightweight Aggregates Plans Saturna Island Plant

British Columbia Lightweight Aggregates Ltd. will build the first expanded shale plant in British Columbia, on Saturna Island, most southerly of the Gulf Islands between Vancouver and Victoria. More than 20,000,000 cu. yd. of shale reserves are available at the site.

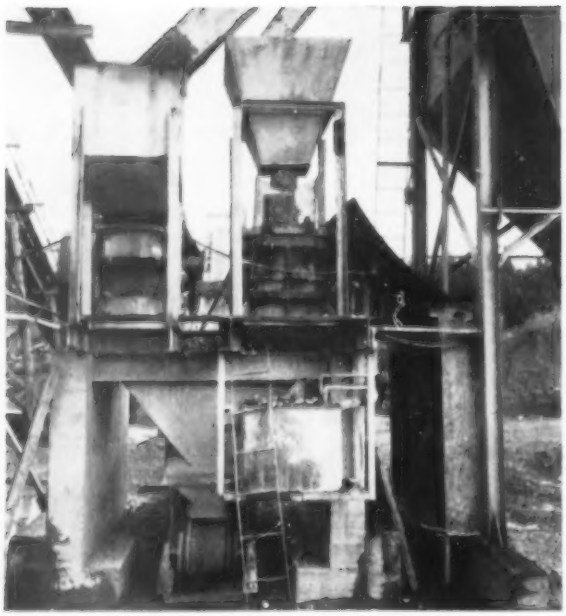
Approximately $600,000 to $750,000 will be spent on the plant and quarry operations. A conveyor will transport the shale from the quarry to the plant, which will be built on Winter Cove, where shipping facilities are to be installed.

Basalt Rock Company of Napa, Calif., is proceeding with the plant engineering design. In charge of quarry site exploration is the local mining consulting firm of Henry Hill & Associates.

This general view of the Miles plant shows the crushed-material (foreground) and the natural gravel bins. Product of the two crushers is returned to the screen in closed circuit by the two short belt conveyors shown.

Miles Co. Adds Crushing Department

By HARRY F. UTLEY



The jaw and gyratory crushers, mounted on concrete supports at ground level, discharge to a common chute feeding the return belt.

THE area around Tacoma, Wash., near the shores of Puget Sound is blessed with some excellent glacial deposits of gravel and sand. These huge moraines contain clean, sound, well-graded material that requires the minimum of processing to yield quality concrete aggregates.

A pioneer producer utilizing one of these deposits is the Miles Company of Auburn, Wash. This concern has also been a long-time batcher of ready-mixed concrete and currently uses about 60 percent of the aggregates output in its ready-mix operations.

Until 1955, only natural gravel was processed. Material larger than 2 in. in size was rejected and stockpiled in the pit until the waste pile

The front-end loader at work in the pit. Both surplus oversize from the pile at the rear and virgin pit-run from the bank at the right are processed.

To Handle Oversize

began to assume alarming proportions. It was then decided to install a crushing department to reduce this surplus to marketable sizes. Two crushers and a screen were placed in this service.

Excavation of the pile of oversize and the pit bank is done by a Hough Payloader, and the material, about half and half of each, is carried by a Ford truck equipped with a 12-ton Gar Wood end-dump body to the plant receiving hopper. A belt conveyor carries from the hopper to an Overstrom triple-deck screen, where two sizes of gravel— ¾ to 1½ in., and ¼ to ¾ in.—are washed, sized, and dropped to a 120-ton compartmented truck-loading bin. Bottom-deck throughs are processed and dewatered as concrete sand by a twin-screw classifier, while the oversize scalped off the upper deck of the screen is conveyed to the crushing department.

The two crushers are set side by side at ground level. One, a 10- by 24-in. KueKen Simplex jaw machine, handles all the reject from the top deck of an Overstrom 2-deck screen which receives the 1½- to 5-in. oversize gravel. The other, a 28-in. KueKen gyratory unit, crushes the material coming off the lower deck of the screen.

Both crushers discharge to a common chute feeding a return belt and are always in closed circuit with the crushing-department screen. The bottom deck of this screen is divided to pass two finished crushed products—minus 1½- plus ⅝-in.; and minus ⅝-in. These two finished materials are stored in a 2-compartment, 75-ton truck-loading bin. Thus, either natural gravel or 100 percent crushed material is separately available for shipment, or they may be blended if desired.

The bin of the Johnson batching plant on the plant property is filled by way of a ramp by dump trucks. Nine 2-way radio-equipped truck-mixers are in service.

Established by the late Frank Miles, the company is now owned and operated by his son, Walter F. Miles. Capacity of the aggregate plant is about 175 t.p.h., of which about 40 tons is crushed material. The ready-mix plant can batch up to 75 cu. yd. hourly.

N.I.S.A.

(*From page* 78)

a 3 percent increase on industrial sand—the same as on common sand. A compromise maximum of 12 cents per net ton was also established. The foregoing was approved by the ICC, and the new rate went into effect on February 15, 1958.

Among the various steps which the chairman indicated the traffic committee has under active consideration are these: suggest to carriers that they correct the bad order situation to the reasonable minimum of total ownership; urge Congress to repeal the transportation tax immediately; and co-operate with rail research committees in studies of long-range results of freight rate increase petitions.

An interesting address by Professor Crepps dealt with the uses, properties, and potential applications of glass. This material has a natural appeal, and one of its biggest assets is its widespread public acceptance.

History indicates the first discovery of glass dates back to about 12,000 B.C.; and the first blown glass examples are dated about 320 B.C. From that time until 1915 there was a gradual development. The latter year witnessed the important invention of boron silica glass—a material resistant to thermal shock.

Since 1930, many other advances have been made in solid and fiber glasses. In manufacturing, the speaker pointed out, each carload of sand received from producers is tested for uniformity of composition, which is a critical factor.

It was noted that potential markets are substantial, one of these being in the field of reinforced plasters. There will also be a potential application in the prestressed concrete industry when research has shown a way to protect glass from attack by pH in concrete.

Considering the current national political picture, Vincent P. Ahearn, N.I.S.A. executive secretary, had very interesting background data for another of the popular Washington Reports, with which the meeting was concluded. The next association meeting is scheduled for October 13 to 18 at the Greenbrier, White Sulphur Springs, W. Va.

deeper frame...

longer swing jaw...

greater reduction!

• And the BIRDSBORO-BUCHANAN Primary Jaw Crusher has reversible jaw plates, saving you 50% on replacement costs. Offset toe lugs, a patented feature, help give you additional savings, often doubling jaw plate life. The Deep-Frame design helps improve your production in several ways. It assures positive nipping action; minimizes slippage; and gives a higher rate of reduction. The longer swing jaw gives you faster crushing to smaller sizes. Like to hear more about its field performance? Your Birdsboro representative has facts and figures. *Main Office, Engineering Department and Plant:* Birdsboro, Pa., *District Office:* Pittsburgh, Pa.

World-Wide Agent Representation. Contact home office for nearest representative.

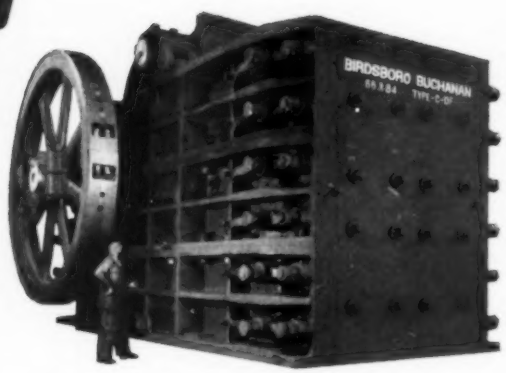
Canadian Representative & Manufacturer: John Inglis Co., Ltd., Toronto, Canada.

CR.-20-58

BIRDSBORO

STEEL FOUNDRY AND MACHINE CO.

STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS • Weldments "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel



Available in sizes ranging from 24" x 36" to 66" x 84"

P&H 3/4 yd. shovel has a mighty appetite!

At pit, plant or yard, no matter what the job—digging, loading, rehandling sand and gravel—the P&H Model 255A has a mighty appetite for work at a profit!

You will get higher production from a P&H 255A with these features:

- **All-welded construction for stamina and strength**
- **P&H hydraulic controls for smoother and faster boom motions**
- **Larger P&H brakes give better braking action**
- **Faster swings with the famous P&H live roller circle**

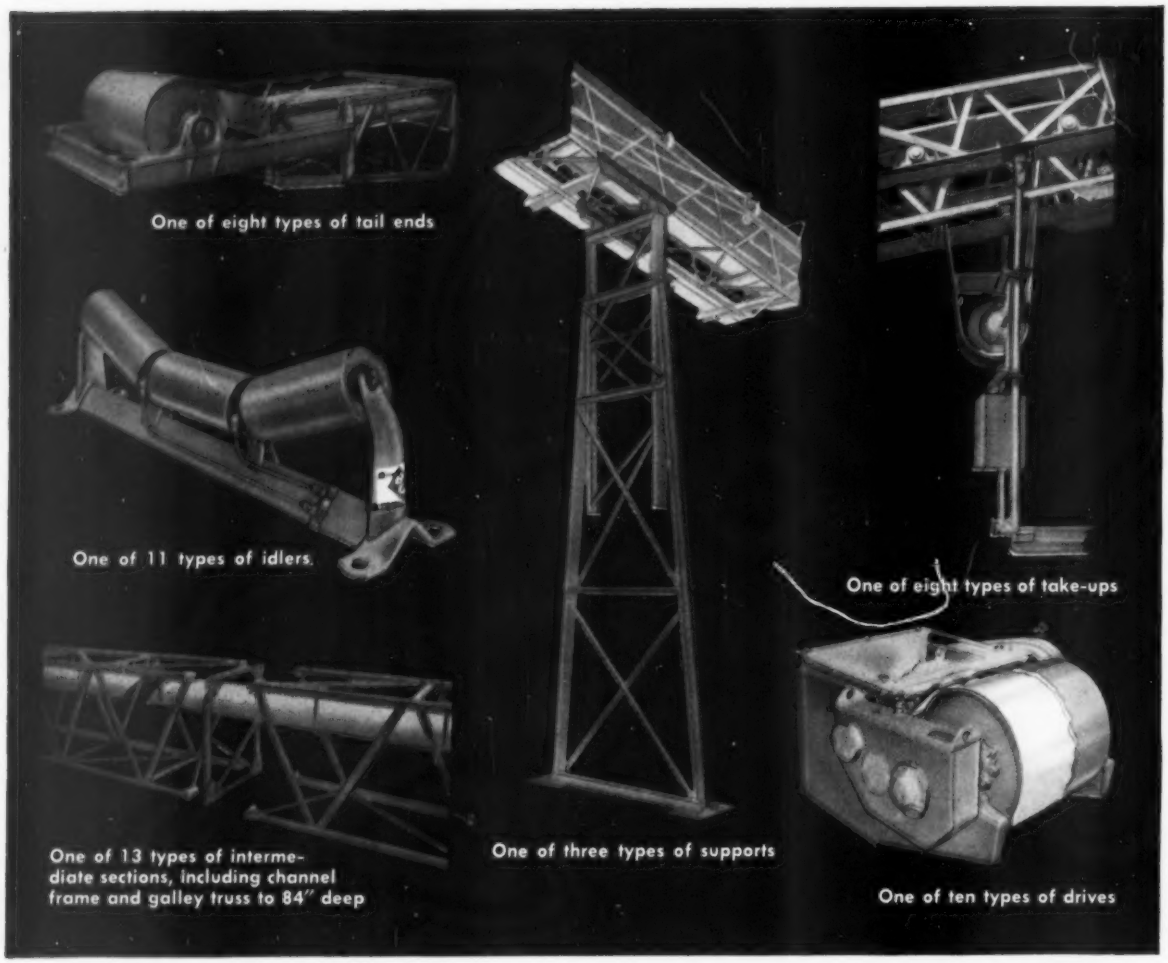
See your P&H dealer soon for the *profitable* 255A story—a story that gets even more profitable when you order your 255A equipped with a P&H Diesel Engine. It's the highly responsive engine with greater torque that outperforms other diesels.

Get the ¾ yard shovel with the BIG appetite for outstanding performance—the P&H 255A.

HARNISCHFEGER

Construction & Mining Division
Milwaukee 46, Wisconsin

THE P&H LINE Excavators: ½ • ¾ • 1½ • 1¾ • 2½ and 3½ yards
Truck Cranes: 10 • 12½ • 15 • 20 • 25 • 30 • 35 and 45 tons


One of eight types of tail ends
One of 11 types of idlers
One of 13 types of intermediate sections, including channel frame and galley truss to 84" deep
One of three types of supports
One of eight types of take-ups
One of ten types of drives

Pictured here are just a few of the many Barber-Greene standardized conveyor components. Each is available in a wide variety of types and sizes, with unmatched flexibility for countless ways of assembly. Write for new bulletin.

Boost conveyor efficiency and cut costs with Barber-Greene standardized components

Every year, more and more belt conveyor installations — long and short, simple and complex — are made up of Barber-Greene standardized, "packaged" components. This standardization means fast, off-the-shelf delivery . . . almost limitless combinations of assembly that cut time and costs on any bulk material handling job . . . components completely interchangeable . . . spare parts readily available . . . simple selection and pricing right from the catalog. Light or heavy, Barber-Greene has the complete conveyor installation you need.

You save these six ways:

- You save special engineering time and expense.
- You save delivery time.
- You save erection time and expense.
- You save on alignment.
- You save on replacement costs.
- You save down time.

58-34-PE

Barber-Greene BG

AURORA, ILLINOIS, U.S.A.

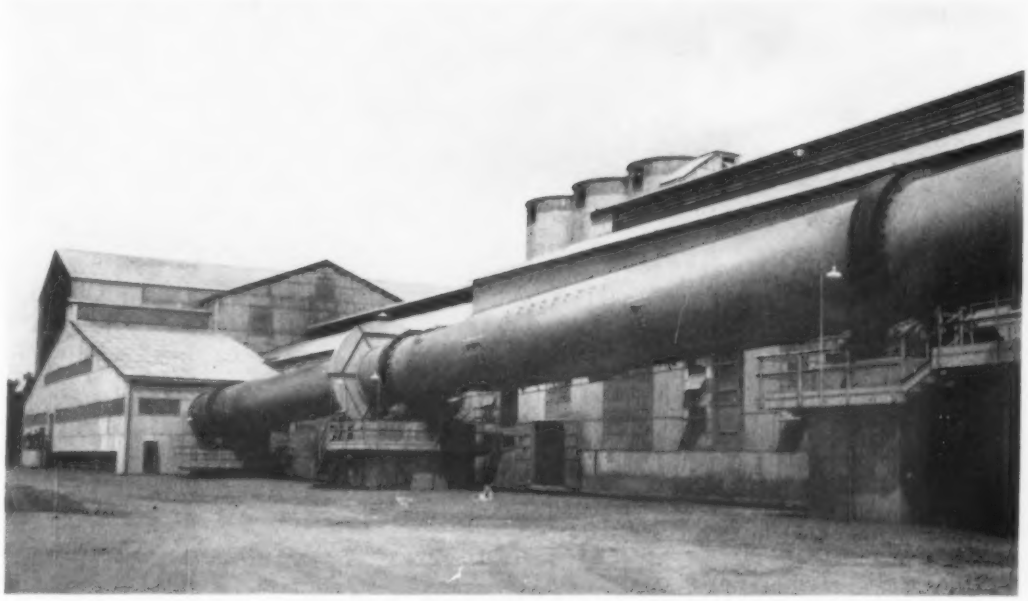
CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT

THIRTIETH ANNUAL

CEMENT MILLS SECTION

PIT and QUARRY

SMIDTH ROTARY KILNS



Over 1250 Smidth Rotary Kilns have been supplied

For Smidth Machinery apply to:

F. L. Smidth & Co., A/S
77 Vigerslev Alle
Copenhagen, Denmark

F. L. Smidth & Co.
11 West 42nd Street
New York 36, N. Y.

F. L. Smidth & Co. (Bombay) Private Ltd.
42 Queen's Road
Bombay, India

F. L. Smidth & Co., Ltd.,
105, Piccadilly,
London, W. 1, England

F. L. Smidth & Co. of Canada, Ltd.
11 West 42nd Street
New York 36, N. Y.

F. L. Smidth & Cie France
80 Rue Taitbout
Paris (9e) France

Get HIGHER OUTPUT!
CUT operating costs!

PUT A WILFLEY SAND PUMP ON THE JOB!

Only Wilfley gives you all this:

- Maintained high efficiency throughout the life of the pump.
- Quick-change features reduce maintenance costs, minimize downtime.
- Long-wearing parts of hard alloy or abrasion-resistant rubber.
- Simple, efficient packingless design and rugged construction assure continuous, trouble-free operation.
- Individual engineering on every application

Wilfley Sand Pumps
"Companions in Economical Operation"
Wilfley Acid Pumps

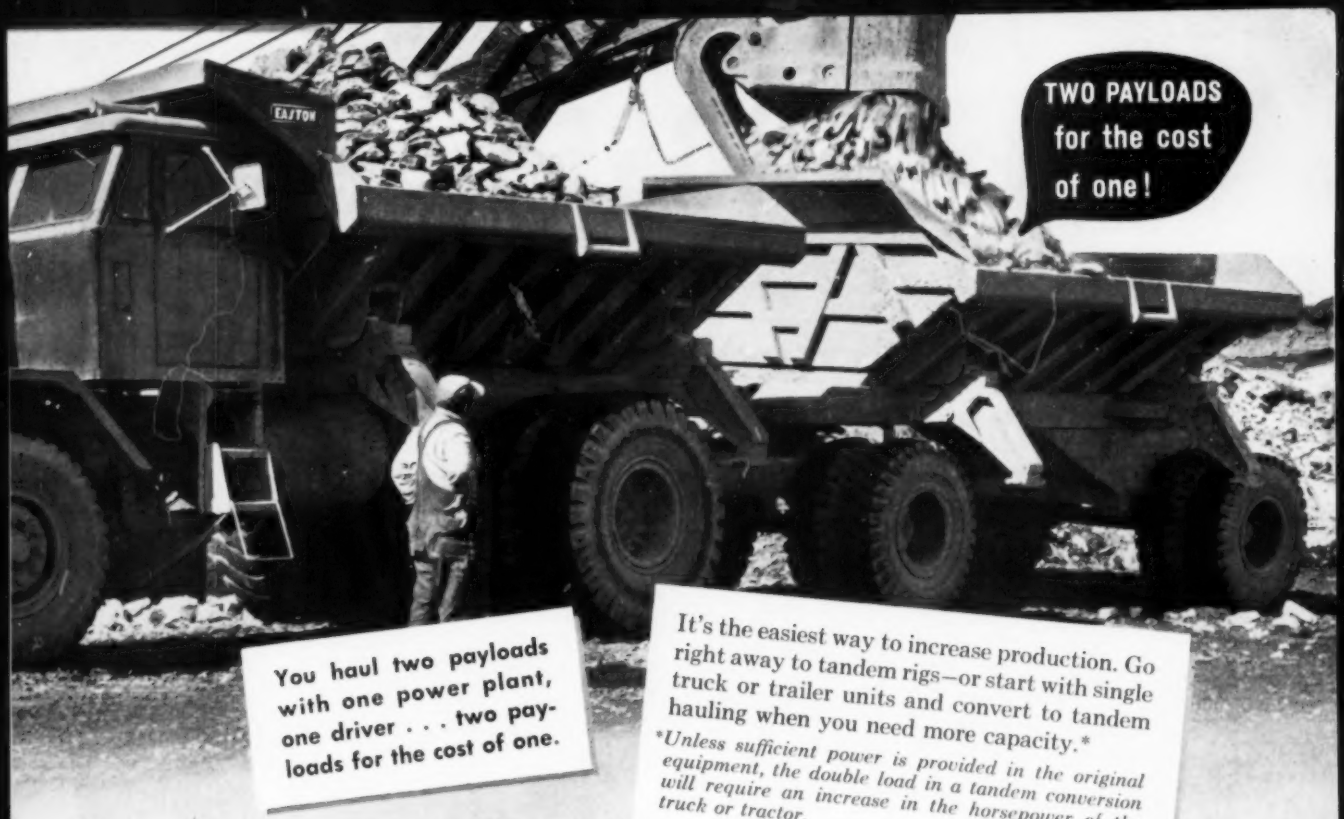
Write, wire or phone for complete details.

A. R. WILFLEY and SONS, INC.

DENVER, COLORADO, U.S.A. • P.O. BOX 2330 • NEW YORK OFFICE: 122 EAST 42ND STREET NEW YORK CITY 17

Enter 98 on card, page 211

Enter 99 on card, page 211 →



TWO PAYLOADS for the cost of one!

You haul two payloads with one power plant, one driver . . . two payloads for the cost of one.

It's the easiest way to increase production. Go right away to tandem rigs—or start with single truck or trailer units and convert to tandem hauling when you need more capacity.*

**Unless sufficient power is provided in the original equipment, the double load in a tandem conversion will require an increase in the horsepower of the truck or tractor.*

Why it pays to haul in tandem!

Each body in a tandem rig is loaded and dumped separately. That is why, in many cases, you can double production with the same shovels, the same crusher and hopper, the same primary conveyors.

You dump to either side with the EASTON automatic electric overhead dumping system. You get all of the advantages of this low-cost, dependable, safe, controlled dumping system. When you convert from single side-dumps to tandem hauling, you keep using the same dumping system, with no change.

All units dump to the side —by far the most practical way to handle quarry rock!

D-1060

You have no maintenance problem. EASTON equipment has proved its rugged dependability by handling more millions of tons of quarry rock than any other type of hauling equipment.

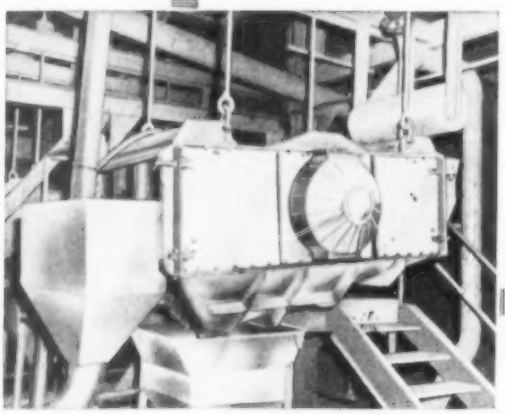
EASTON's exceptional experience in quarry hauling systems is at your service. Capacities range from 14-ton single units to 72-ton tandem rigs.

Write today for Literature No. A3

EASTON®

EASTON CAR & CONSTRUCTION COMPANY . . . EASTON, PA.

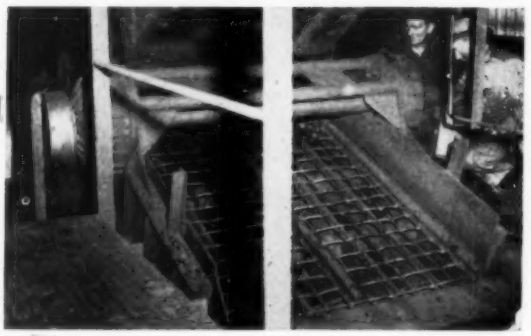
Why GYROSET SCREENS are Money-Makers!



Suspended Gyroset 3' x 6' scalping oyster lime slurry at 1/8" opening, for a large cement company.

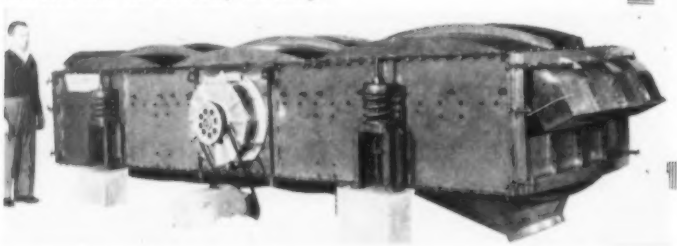
• • • • uniform sizing

5' x 8' special scalping screen with abrasion resistant liners—5" opening.



• • • • • • lower costs

Enclosed unit for fine dusty screening.



• • • increased output

GYROSET-equipped plants are "all set" to achieve peak screening efficiency in 1958.

The positive eccentric action of GYROSET Screens gives a full circle throw over the entire screen surface. With only two bearings, the eccentric action has the fewest moving parts.

GYROSET Screens are equally effective for sizing slurry scalping, washing or dewatering. They can operate at any degree of pitch (or slope). Easily adjustable for maximum output when rough scalping. Can be set for top efficiency in grading or dewatering with output exceeding any other screening unit. Stroke adjustable from 0 to 3/8".

Enclosed unit for fine dusty screening such as finished cements, fine ground stone, lime, etc.

These machines are simply but ruggedly built, and adaptable in action. Sizes available: 36" to 72" wide, 4' to 16' long, one to three decks.

Write today for full details

GYROSET Advantages

- ► **Positive Eccentric Action**
- ► **Positive Stroke Adjustment**
- ► **Only 2 Bearings**
- ► **Heavy Structural Shaft Housing**
- ► **Center line of bearing and fly wheel close to side sheets for minimum overhang.**
- ► **Taper lock fly wheel bushing for assured tightness and ease of maintenance.**

PRODUCTIVE EQUIPMENT CORP.

2924 W. LAKE ST., CHICAGO 12, ILL.

More and more cement companies are turning to

CEDARAPIDS DOUBLE IMPELLER IMPACT BREAKERS

Here's Why!

5360 H DOUBLE IMPELLER IMPACT BREAKER turns out 1000 tons of limestone per hour in Kansas. Cedarapids Vibrating Grizzly, 5 Horizontal Vibrating Screens and 4 Hammermills, plus conveyors, complete the plant.

IN MONTANA, a 3042 Double Impeller is reducing wet quarry-run limestone, containing 4% silica, to ⅜" minus. The owner says "It's ideal equipment for this kind of rock."

AT A CEMENT COMPANY'S QUARRY IN MICHIGAN, a 5360 Double Impeller is reducing extremely hard quarry-run shale to 3" minus. Operating 8 hours a day, the unit requires practically no maintainance.

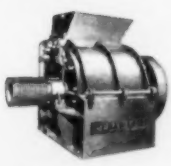
- **BIG TONNAGE PRODUCTION** . . . Up to 1000 tons per hour output meets capacity demands to supply today's expanding market.
- **HIGH RATIO OF REDUCTION** . . . 40 or 50 to 1 reduction ratio cuts production costs. Cedarapids Double Impellers, which reduce 53" diameter material to minus 3" in one pass, are often used for simultaneous primary and secondary reduction, thus reducing the need for auxiliary secondary crushers, screens, conveyors, etc., and cutting power requirements.
- **LOW MAINTENANCE COSTS** . . . With rock fed from the highest point of the unit, the entire breaking chamber is utilized for breaking rock in suspension. Incoming rock is struck and broken by rock hurled upward and outward at terrific speed by oppositely rotating impellers. There is approximately 50% less contact of stone on metal, thus reducing wear on impellers and breaker bars.
- **TRUE IMPACT ACTION** . . . The discharge opening is wider at the discharge end to eliminate any possibility of scrubbing action or pressure crushing that result in excessive wear and high power consumption. Breaking is accomplished only by impact of rock against rock and against breaker bars and impellers.

These are but a few of the many Double Impeller features that help cement companies step up output and cut production costs for crushing limestone and shale. See your Cedarapids distributor for complete details about *all* Double Impeller Impact Breakers.

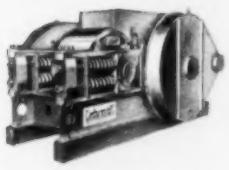
IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa, U.S.A.

Cedarapids — Built by IOWA

CEDARAPIDS SERVES THE CEMENT INDUSTRY WITH A COMPLETE LINE OF EQUIPMENT



HAMMERMILLS produce a much finer quality of product, and size for size produce more tons per hour than other similar types of equipment in the market.



ROLL CRUSHERS, in 8 sizes with 3 types of roll shells, insure high capacity of the smaller size finished products you want.

HORIZONTAL VIBRATING SCREENS provide as much as 12½% greater screening area than inclined screens of the same size. Available in 3' x 8' to 60" x 16' sizes, with double or triple decks.

HEAVY-DUTY FEEDERS designed to feed big crushers with a smooth, workable flow of material, and withstand the shock of heavy dumping.

WEST VIRGINIA PULP AND PAPER

230 PARK AVE., N. Y. 17, N. Y. · PLANTS: TORRANCE, CALIFORNIA · ST. LOUIS, MISSOURI

ANNOUNCING THE NEW Toughness Champ

OUR CLUPAK* MULTIWALLS

These new multiwalls can take more of a beating without breaking.

They're made with the revolutionary new Kraftsman Clupak paper which has built-in "stretch." This paper stands up under impacts and drops that burst ordinary multiwall bags.

As a result, you and your customers are both happier. You both save money. You can store, transport, use—and abuse—our Clupak multiwalls with a rough and ready carelessness that spells "waste" for ordinary old-fashioned multiwalls!

Amazing fact: they cost no more than ordinary multiwalls!

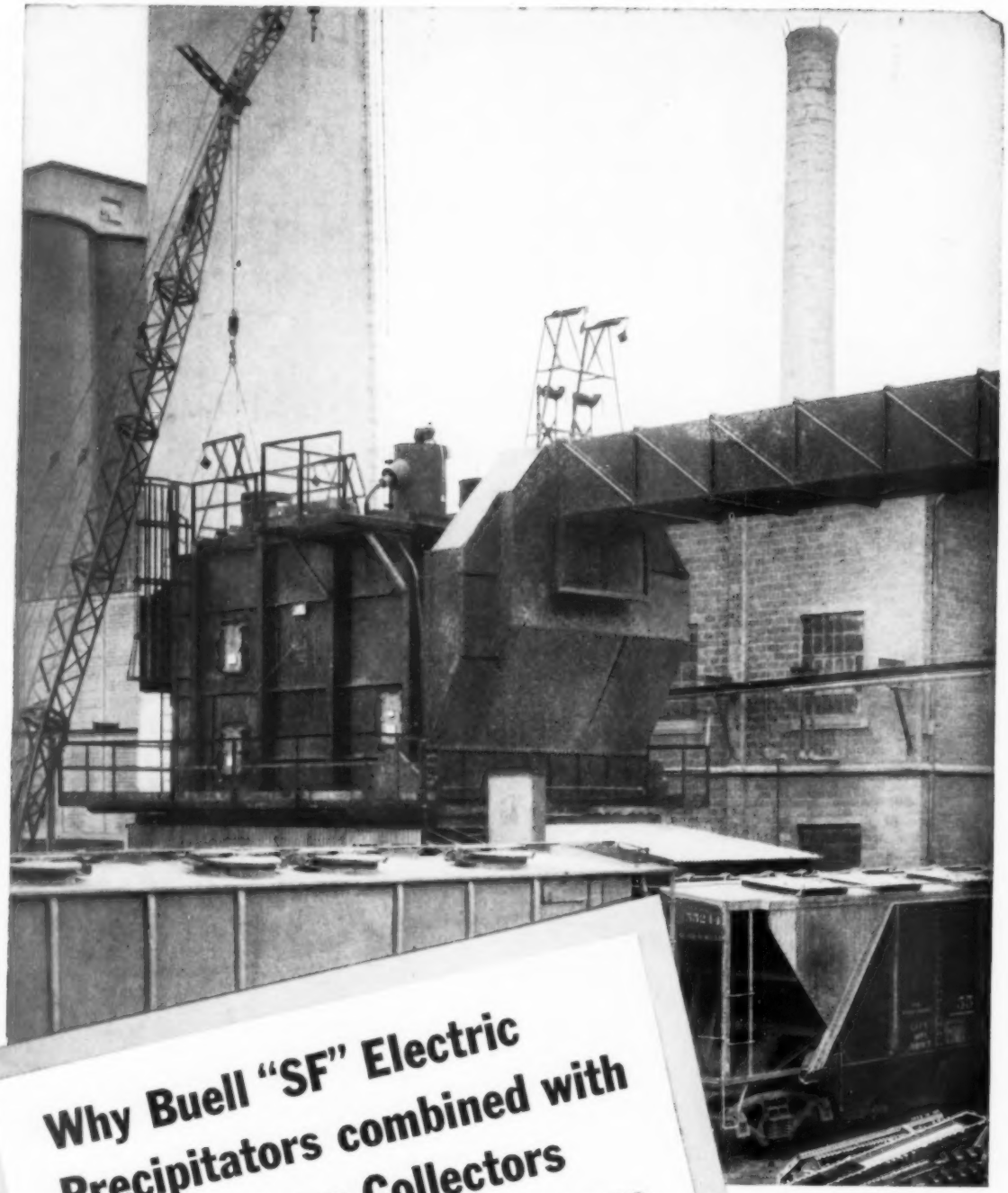
Our Clupak multiwalls are available now in these types: Pasted Open Mouth, Pasted Valve, Sewn Valve, Sewn Open Mouth and Stepped End.

All of them are lighter and tougher—try them. On your next carload order, let us include a trial shipment of 5,000 of our Clupak multiwalls. Call or write:

COMPANY · MULTIWALL BAG DIVISION

NEW ORLEANS, LOUISIANA · MOBILE, ALABAMA · WELLSBURG, WEST VIRGINIA

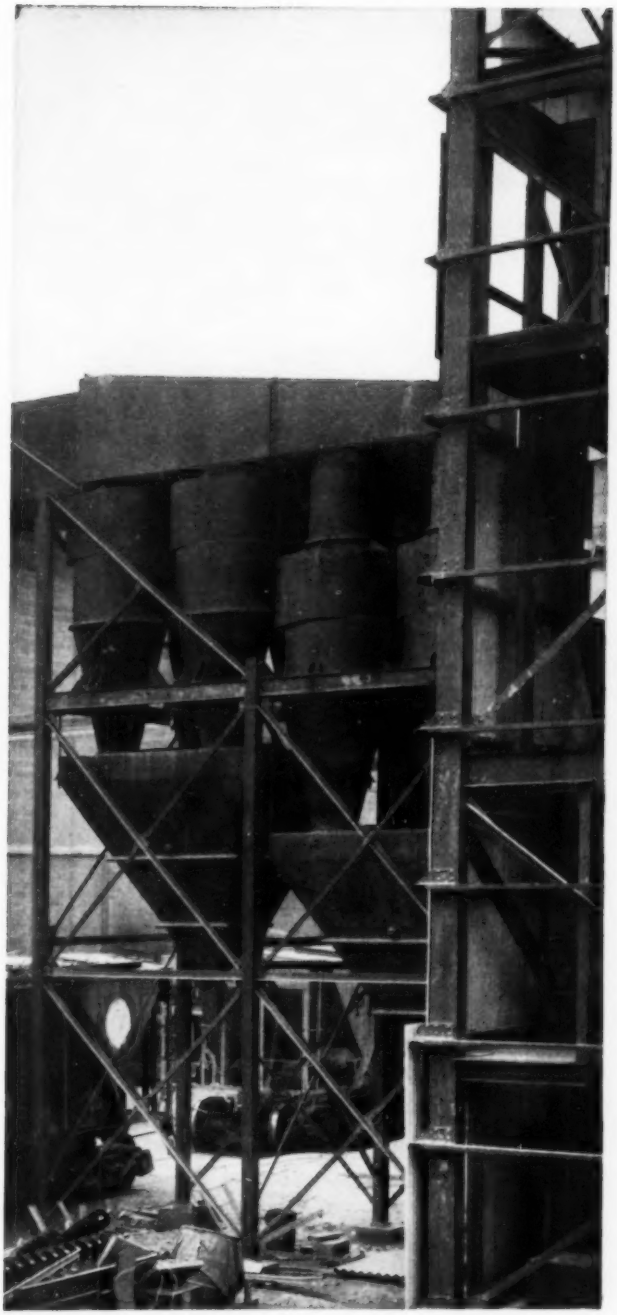
**Clupak, Inc.'s trademark for stretchable paper.*



Why Buell "SF" Electric Precipitators combined with Buell Cyclone Collectors assure an extra percentage of EFFICIENCY

MECHANICAL ELECTRICAL

Experts at delivering



When Buell "SF" Electric Precipitators and Buell Cyclone Collectors are installed in tandem . . . you have the ultimate in efficiency *under all conditions*. Because their basic principles of operation are different, they complement each other in such a manner as to provide two important advantages: (1) increased efficiency, and (2), improved stability. For example, changes in the characteristics of dust particles or gases will not appreciably affect the percentage of efficiency of the combined units.

Buell "SF" Electric Precipitators with their exclusive "Spiralectrodes" are unequaled in the recovery of fine dust particles. Featuring continuous rapping and many other exclusive design advantages, they are your guarantee of that all-important extra percentage of efficiency—often the difference between a highly profitable recovery operation and a break-even one.

Buell Cyclone Collectors with their large diameter, clog-proof design, also offer you the kind of efficiency that results in many extra tons of recovered valuable dust. Whereas the secondary air currents in most collectors tend to lower efficiency, Buell's exclusive shave-off design utilizes them to recover more dust.

For detailed information on how Buell equipment is delivering that all-important extra percentage of efficiency in the cement and lime industry, write Dept. 18-G, Buell Engineering Company, 123 William Street, New York 38, New York.

Free Booklet

Describes all three Buell Systems for the recovery of valuable dusts.

buell®

Extra Efficiency in **DUST RECOVERY SYSTEMS**

At the left in this aerial photograph of the new Picton, Ont., dry-process plant of Lake Ontario Portland Cement are the dock loading and unloading facilities. Farthest left is the bulk cement storage and loading installation for lake shipments. A retractable boat loading boom conveyor, fed from a reclaiming tunnel below the four screening and stockpiling towers, is seen near the middle of the dock. The nearest installation is for unloading coal and gypsum from lake freighters. At the upper left is the quarry area as it appeared soon after initial operations. The storage structure, right center, accommodates both raw materials and cement clinker, and the adjoining mill building on the far side houses the four milling circuits.

Lake Ontario

By BUREN C. HEROD

ANOTHER ON THE SPOT REPORT

MODERN, flexible design, combined with an excellent location and an almost unlimited amount of exceptionally high-grade raw materials, forms an auspicious background for the initial operations of the new Lake Ontario Portland Cement Co. plant near Picton, Ont.

Built on a limestone bluff overlooking navigable water of Picton Bay, Prince Edward County, this latest addition to Canadian cement industry has a production capacity in excess of 5,000 U. S. barrels per day, and can ship its products *via* water, rail, or truck.

A dry process plant, the new facility was built around a basic design developed by A. J. Anderson, general manager, whose association with the cement industry includes an international background in cement plant construction. Construction of the Picton mill, which incorporates two 11-ft. diameter by 375-ft. long rotary kilns, and four identical ball mills for raw and finish grinding, was started in the summer of 1956. The first clinker was produced in March of this year, and although the design capacity of each kiln is approximately 2,500 bbl. per day, operations already indicate that these units may surpass 3,000.

An integral part of the cement plant but an impressive commercial operation in its own right, is the 750-t.p.h. aggregate plant, from which the cement mill is supplied with ¾-in. limestone. The latter, as well as a substantial tonnage of commercial aggregates, is produced in dual crushing and screening flow lines. These exist between a primary crusher-run surge pile and finished material stockpiles. Flexibility of stone plant design permits not only

New Canadian operation also has U.S. storage, packing, and distributing facilities. Enjoys excellent location, top-quality raw materials, multiple shipping setup.

Portland Cement Company

a direct feed to the cement plant from a cement stone production line, but also the withdrawal from any stockpile for recirculation to secondary re-crushing and screening in either the cement stone or an aggregate production line. Any fines produced in the latter, which may not be salable commercially, are also subsequently reclaimed from stockpile and fed to the cement plant.

As shown by the accompanying aerial photo, the plant site presents an interesting appearance. On the south side of the highway are the quarry, aggregate plant, final stone screening and stockpiling towers, coal and gypsum stockpiles, dock loading cement silos, and the concrete-filled caissons comprising the 1,200-ft. dock. Stone-handling facilities installed on the dock can load lake freighters with aggregate at the rate of more than 2,000 t.p.h. With the bulk cement system, lake

A general view of the quarry area. Top quality stone is present to a depth of at least 60 ft.

As shown here, two trucks can dump simultaneously into the primary crusher. Dust-suppression spray nozzles are installed on the corner columns.

boats can be loaded at the rate of 3,000 bbl. per hour; and the installation for handling incoming coal and gypsum has a capacity of 2,000 t.p.h.

On the north side of the highway are all the operating components of the cement mill, including raw storage, mill building, kilns, blending and kiln feed silos, storage silos, packhouse, and facilities for bulk loading of both rail and truck units.

With respect to major equipment, most units in each phase were acquired from the same supplier. The kilns and all milling units are Kennedy-Van Saun equipment. The entire aggregate plant conveying system and that supplying the cement plant is comprised of Jeffrey conveyors. These are largely fitted with Dominion Rubber belting. Tyler screens and screencloth are used throughout the aggregate plant; crushing equipment is by Kennedy-Van Saun. Fuller-Huron Airslides, plus Fuller-Kinyon pumps and compressors are used for all handling of finished cement and for transport of milled raw kiln feed. Clinker coolers are also Fuller equipment.

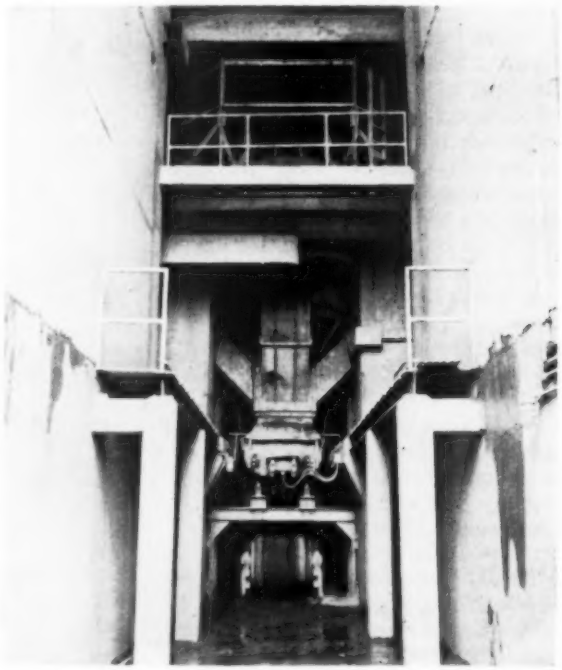
All raw materials used in the manufacture of cement, except coal and gypsum, are obtained from nearby company properties. In addition to clay acreage, there is also available a substantial tonnage of sand having a chemical composition which meets the requirements for iron oxides, silica, and alumina to a remarkable degree. Clays, as required, and sand are trucked from their respective pits to the plant's raw materials storage building.

The limestone is quarried in a bluff area between the cement plant and Picton Bay. Exploratory drilling preceding construction of the plant disclosed at least 60 to 70 ft. of high-grade (90 percent plus $CaCO_3$) limestone. While this is now being removed from a 32-ft. face, future quarrying plans are predicated on removing a full 60 to 70-ft. face down to 5 ft. above water level.

Primary blast hole drilling is carried out with an Ingersoll-Rand Drillmaster equipped with a 6-in. Carset bit. The present drilling pattern ordinarily follows a 15- by 14-ft. burden-spacing ratio. Both forcite and dynamite are used in blasting, and to date have provided a yield of about 4 tons per pound of explosive. This factor, however, is expected to increase as operations advance.

Loading and hauling of the blasted stone is handled by a P&H 4½-cu. yd. electric shovel, and four 22-ton end-dump Euclid trucks. The latter now have a relatively short haul from the quarry floor to the primary crusher, a 40-in. Kennedy-Van Saun gyratory.

The primary crusher installation was constructed by excavating into the virgin rock. This was done to a depth of approximately 40 ft. below the elevation of the plant site. Excavation was followed by pouring of the reinforced concrete foundations and the supporting structure. The installation was so designed as to allow two trucks to dump simultaneously. (See accompanying photograph.) Driven by a 450-hp., 109 r.p.m. synchronous motor, the



Solid rock was excavated to a depth of 40 ft. to house the 48-in. gyratory primary crusher, and the conveying system which follows.

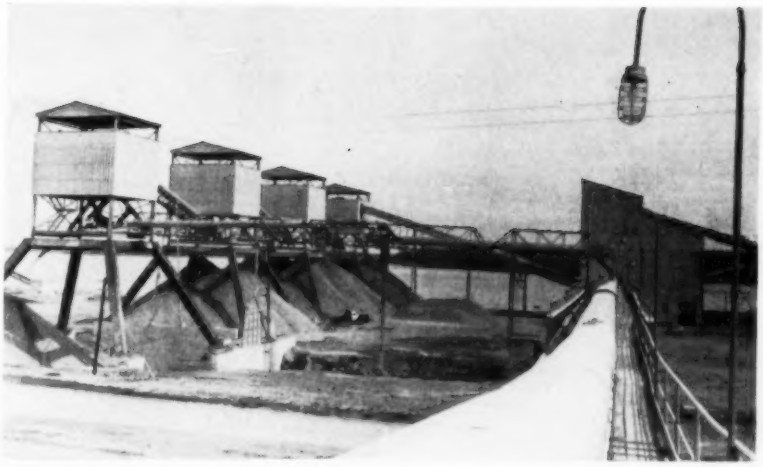
primary crusher has a 6-in. setting. Material reduced in the primary crusher is transferred by a Jeffrey vibrating feeder to a 42-in. by 224-ft. inclined belt conveyor on which a Fairbanks-Morse continuous weigh conveyor scale is installed to record all tonnage transferred. From a transfer point at ground level, this conveyor discharges to a 42-in. by 180-ft. radial stacker. The latter in turn discharges from a height of about 45 ft. to a kidney-shaped surge pile with a capacity of approximately 20,000 tons.

A 250-ft. concrete reclaiming tunnel below this surge pile houses two reclaiming conveyors; one—a 42-in. by 235-ft. unit—initiates feed to the aggregate production line, while the other—a 36-in. by 190-ft. conveyor carries stone on the first stage to the cement stone production line. Five clamshell gates and three Jeffrey vibrating feeders supply the former, while the latter receives stone through three gates and two feeders.

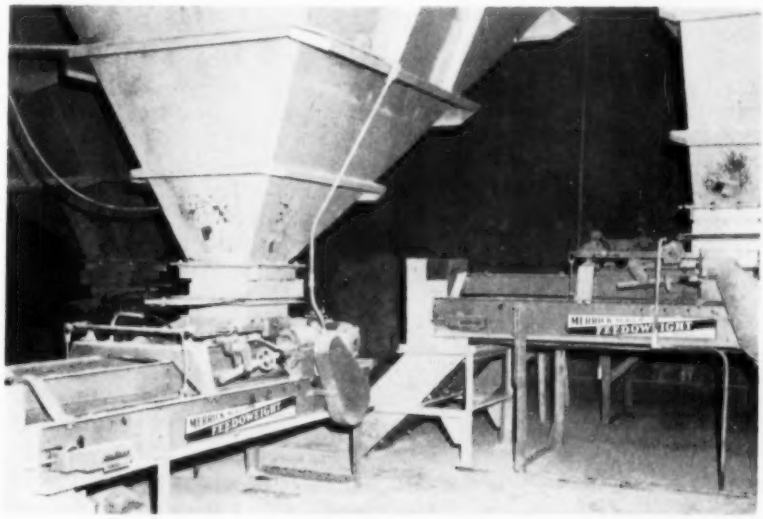
Each of the tunnel conveyors transfers to the respective one of two inclined belts, each approximately 300 ft. on centers, on which the stone destined for cement feed or for aggregate production are started on their dual flow lines. Both of the latter conveyors rise to the top of the secondary crushing and screening house, where the two production lines incorporate a total of six screens and five reduction units.

In the cement stone flow, the 36-in. belt discharges to a pair of 5- by 12-ft. double-deck screens. Each is fitted with 4½-in. and 1-in. opening screencloth on the top and bottom decks, respectively. Material retained on both decks of each screen is discharged to the respective one of two Kennedy - Van Saun Senior cubers. Products of the latter are chuted to a 24-in. by 143-ft. belt conveyor on which they are returned to the cement stone feed belt in closing that circuit.

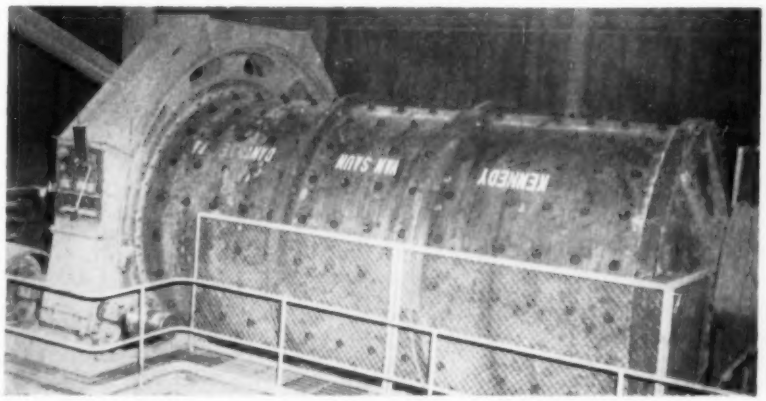
Bottom deck throughs from the two cement stone screens may go either of two ways—to a conveyor on which they are transported directly to the cement plant raw storage building, or to a conveyor leading to the first of four aggregate stockpiling and screening towers. In the former flow they are discharged



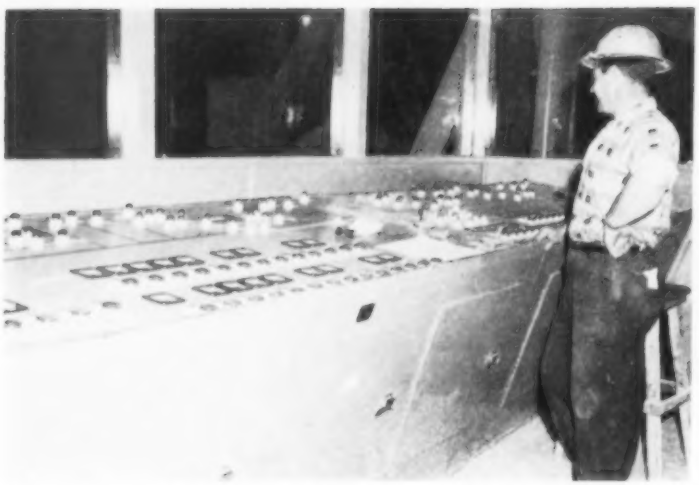
Two parallel flow lines are operated in the secondary crushing and screening house (right). Commercial aggregates, and stone for cement are delivered to the towers (left). The conveyor (right foreground) provides a direct feed from the secondary plant to the cement mill raw-storage building.



This installation is illustrative of the feed system for all four mills, in this case, that for one of the finish circuits.



One of the 11- by 20-ft. ball mills. With the exception of ball load and the drying of raw mill feed in the classifiers, all four milling circuits are identical.



Feed, operation, and discharge flow of the milling circuit is handled from this control panel.

to a 24-in. by approximately 350-ft. bridge conveyor and transported across the highway to the cement plant. In the latter flow they are discharged to a 36-in. by 206-ft. inclined belt and carried to No. 1 tower.

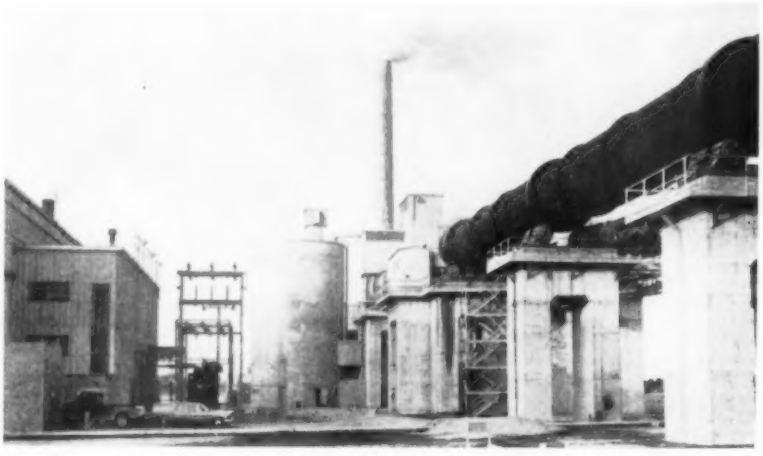
In the parallel aggregate production line, stone transported from the surge pile to the secondary crushing house is split to a pair of 5- by 12-ft. single-deck scalping screens. Oversize from both of these is chuted to a 20-in. intermediate gyratory from which the discharge is fed to a 30-in. by 147-ft. return belt in closing the circuit. The scalper throughs are split to two 49½ fine reduction gyratory crushers and to a pair of 5- by 14-ft. double-deck screens. Both of these screens are fitted with 2½-in. square opening screencloth on the top decks and $^{3}/_{16}$- by 5-in. slotted openings on the bottom deck. Top-deck retained material is chuted to a second No. 49½ gyratory from which discharge is sent to the above return belt, in closing the final reduction crushing circuit. Bottom-deck retained and passing fractions are fed to the 36-in. conveyor leading to screen tower No. 1.

Erected in a single line, on about 103-ft. centers, the four towers are approximately 90 ft. high. All are identically equipped, each having a pair of 5- by 14-ft. single-deck screens. Aggregate retained on 1½-in. opening screens of No. 1 tower is chuted to an underlying stockpile, while that passing flows to a 36-in. by 117-ft. belt for transfer to tower No. 2. Here the flow is separated on the 1-in. opening screencloth of each screen, with the retained fraction chuted to stockpile and throughs flowing to another 36-in. by 117-ft. belt. On the latter, the minus 1-in. material is transferred to tower No. 3, where separation is made on ½-in. opening screencloth and thence to tower No. 4, where a $^{3}/_{16}$-in. opening screencloth is installed.

An unusual feature of this stockpiling installation is the fact that the stockpiles actually accommodate approximately twice the tonnage held in an ordinary ground level stockpile. This was accomplished through the excavation of a long trench with a V cross section. At the base of the trench a reclaiming tunnel was constructed. With the side of the trench excavated at 40 degrees from the horizontal, approximately the same as the angle of repose of the material, the stockpiling capacity was virtually doubled. Concrete walls form partitions for the various materials stockpiled.

From tower No. 4, the finest fractions—$^{3}/_{16}$-in. to dust— are removed at right angles on a 36-in. horizontal belt conveyor to a fixed tripper from which they are discharged to a fifth stockpile. These materials may also be transferred through a chute from the tripper to a short belt connecting with the bridge conveyor that leads to the cement plant. A reclaiming tunnel below this fine material stockpile houses a 36-in. conveyor on which the materials may be reclaimed for transfer to the tunnel below the four screening towers. With this installation, any fraction in the five stockpiles may be transferred to the mouth of the tunnel below the screening towers and then diverted in either of two lines.

From one line, these products are discharged to a retractable boom boat-loading conveyor. From the other, they are discharged to an inclined belt and subsequently to a travelling tripper for feed to either the cement stone or the aggregate feed belts leading to the top of the secondary crushing and screening tower. This system, as noted previously, allows the recirculation of any stockpile fractions to the sec-



This view of the kilns toward the feed end also shows a part of the mill building (left) and the 9,700-bbl. kiln feed silo (center). Beyond the stack are four raw-mix blending silos.

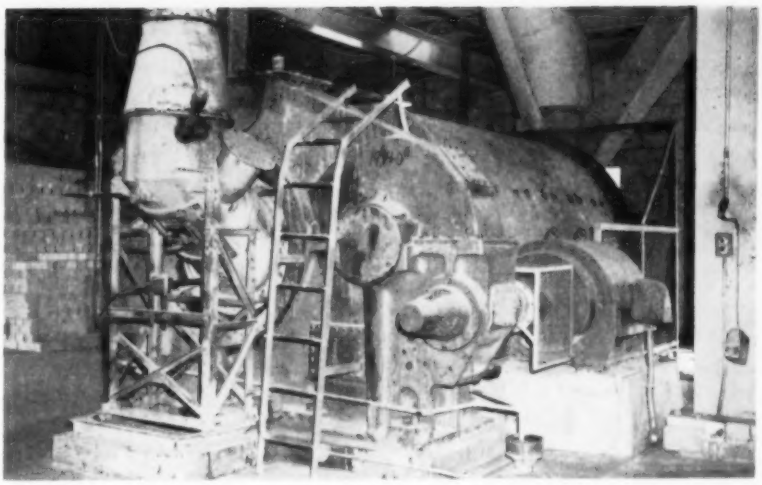
ondary crushing and screening flow for production of finer sizes. Draw of materials from respective stockpiles onto the tunnel belts is accomplished with a battery of vibrating feeders. Coal and gypsum are similarly recovered from their stockpiles, but the conveyor on which these are transferred to the cement mill's raw material building is housed in a tunnel that passes below the highway.

Along one side of the 250-ft. long raw storage building, are two 24-in. belt conveyors. One, equipped with a travelling tripper, receives the cement stone from the bridge conveyor connecting with the aggregate plant. The other, similarly equipped with a tripper, receives the coal and gypsum from the tunnel belt. The respective materials are discharged to their appropriate storage areas *via* these trippers. All other ingredients used in the cement process are trucked to the storage buildings and rehandled by a 5-cu. yd. Provincial Engineering overhead travelling crane which has a span of 100 ft.

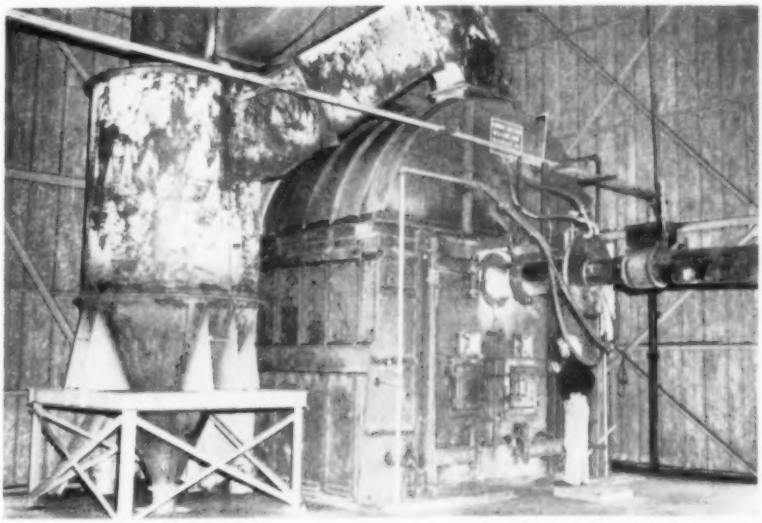
With the travelling crane, the various raw materials are transferred from storage piles to a group of mill feed bins located on the opposite side of the raw storage building from the feed conveyors. Materials entering the two raw milling circuits are transferred from these feed bins on Merrick Feedoweights, which in turn discharge on to a 24-in. mill feed conveyor belt. The latter transfers material either directly to the two raw mills or to a bucket elevator. In normal operation, the material is fed to the elevator in each circuit and is raised to discharge into a 16-ft. Raymond double whizzer classifier. This system, as described thus far and below, is identical for all four milling circuits.

Feed for the raw mills is dried in the classifiers with air at 900 deg. F., supplied from a coal-fired furnace. Each classifier is provided with approximately 24,000 c.f.m. of hot drying air. Rejects from the raw mill classifiers are fed directly to the raw mills, while the fines are piped to Airslide conveyors for transport farther in the flow.

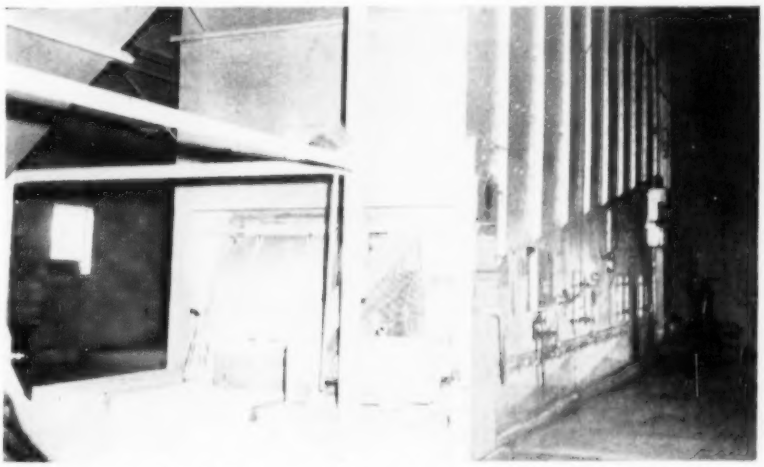
The four mills, as noted earlier, are identical 11-ft. diameter by 20-ft. long units driven by 1250-hp. G-E synchronous motors through



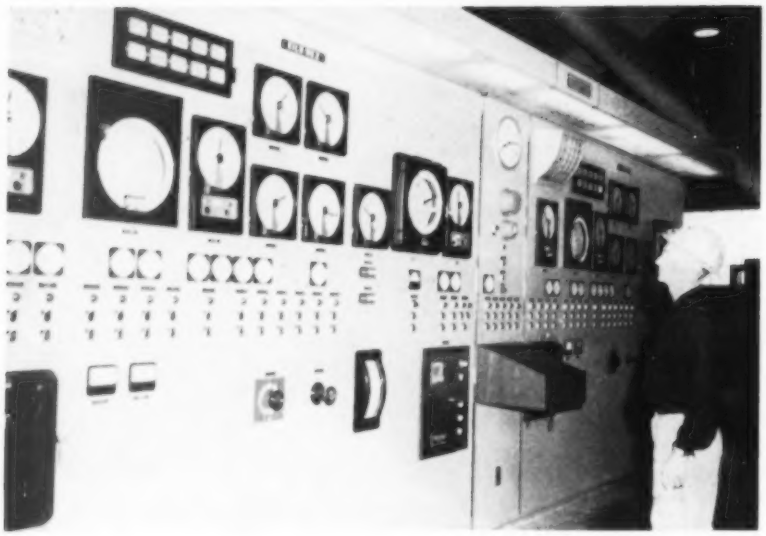
The kilns are fired with West Virginia coal, which is pulverized in air-swept coal mills of this type.



A view on the firing floor. Hot air collected from the kiln hood in the cyclone (left) is tempered and supplied to the coal mills for fuel drying and as primary combustion air.

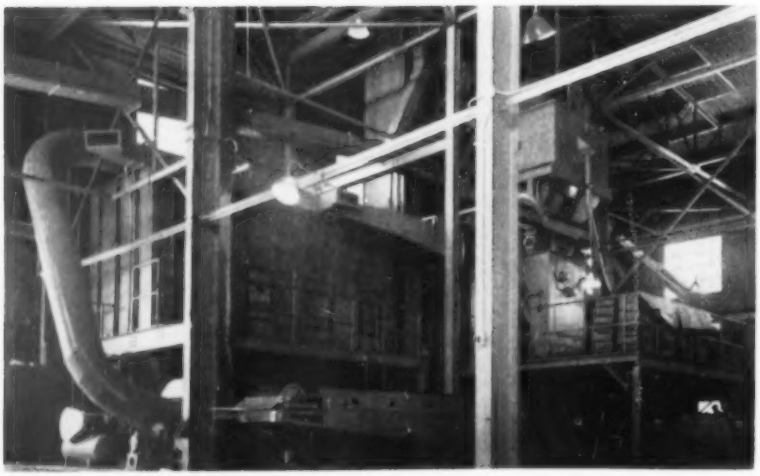


One of the 7- by 40-ft. inclined grate clinker coolers with clinker breaker (foreground).



Control panels for the two kilns and related equipment.

The plant storage silos and packhouse at Picton are quite similar to those at the Toronto, Ont., and Rochester, N. Y., distributing points. However, the silos at those two locations have greater capacities.



A view of the packing facilities in the Rochester, N. Y., distributing plant.

magnetic clutches. The only physical difference between the raw- and finished-milling operations is in the ball load. In the case of the two raw mills, the primary compartment of each is charged with 20 tons of 2-in. and 10 tons of 3-in. balls, while the secondary is charged with 70 tons of 1¼-in. balls. All mills operate at 18 r.p.m.

Raw mill discharge is transported *via* Airslide to the boot of the bucket elevator, in which it is raised to the respective classifier. This completes the milling circuit. Dust collection from the mil classifier and elevator in each circuit is handled by two Norblo bag-type dust arrestors. Each pair is equipped with a common exhaust fan of 24,000 c.f.m. capacity at an 8-in. S.P., and 180 deg. F.

Material collected in these units, and classifier discharge at a Blaine fineness rating of 6,000 plus, are removed *via* Airslide to the hopper above a pair of 10-in. Fuller-Kinyon pumps. These two pumps are provided with air by a C-300 Fuller rotary compressor with a capacity of 1572 c.f.m. at 40 p.s.i.

The raw-milled material is transported through a 10-in. line to a group of four raw-blending silos, each with a 4,000-bbl. capacity. As drawn from a given blending silo, in accordance with chemical analysis, the raw mix is transferred *via* a system of Airslides and either of a pair of 10-in. Fuller-Kinyon pumps to the 9700-bbl. kiln feed silo. The material is maintained in a fluid state in this silo by means of four cycling valves supplied with air at 20 p.s.i. by a rotary compressor.

The raw mix is removed from the feed silo through a rotary valve to an Airslide, thence to a constant-head level box, and finally to a de-aerating screw conveyor. The latter, in turn, supplies a constant-feed box from which two screws feed a pair of elevators that raise the raw mix to discharge in the respective kiln feed pipe. Excess kiln feed is returned *via* Airslide and a third bucket elevator to the constant-head level box.

Each of the 11-ft. by 375-ft. rotary kilns is fitted with a Kennedy-Van Saun recuperator system for a length of 100 ft. from the feed end. They are driven at approximately 1 r.p.m. by 125-hp. Reliance mo-

tors through Falk speed reducers, and ride on six tires. West Virginia coal is used in firing the kilns, and during early operation fuel consumption has ranged from 800,000 to 900,000 B.t.u. per bbl.

Coal is brought to the kiln firing building *via* belt conveyor from a transfer point at the raw storage building. The fuel is conveyed directly from outside storage to the coal bin for the kiln coal mills. Coal is also conveyed directly to the raw material storage building, where it is rehandled to the hot air furnace feed bin. It is delivered by disc feeders from the storage bin in the firing building to the 7- by 12-ft. air swept coal mills. Primary combustion air is drawn from the respective kiln hood to a 5-ft. 6-in. cyclone, where clinker dust is dropped. Hot air exhausted from the cyclones is tempered so that the temperature of the air and coal mixture discharged from the coal mill is 150 deg. F. Coal-laden air exhausted from the mills enters classifiers from which rejects are returned to the mill, while the fuel and air mixture continues on to the kiln burner pipes. The air stream in this system is provided by the primary air fan, which has a 9,200 c.f.m. capacity at 19.6-in. S.P., and is driven by a 60-hp. motor. The coal-air mixture is fed through 11-in. diameter burner pipe at 6,900 c.f.m. and 150 deg. F.

Burning temperatures of approximately 2,600 deg. F. are maintained in each kiln. Exhaust gas temperature in the dust chamber is approximately 1,000 deg. F., and the temperature of the gases entering the following dust collectors is about 700 deg. F. These gases are drawn through the respective 120,000 c.f.m. capacity Buell dust collectors for each kiln by Sturtevant induced-draft fans at the base of the 200-ft. stack.

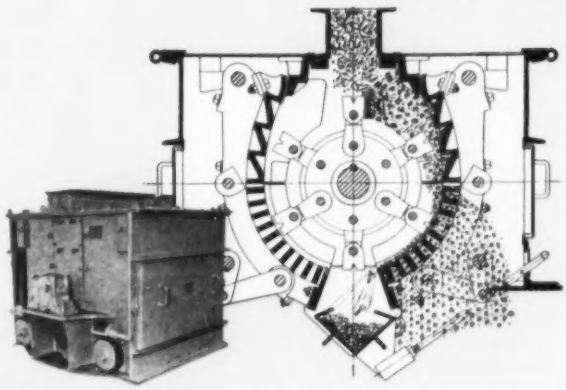
Clinker discharge from the kilns enters 7- by 40-ft. Fuller inclined-grate clinker coolers, to which air is supplied by 44,510 c.f.m. Norblo blowers. A 41,730 c.f.m. induced-draft fan on each cooler draws air from above the grate to exhaust through a vent stack. Each grate feeds clinker to a breaker from which the material is discharged to a 24-in. oscillating pan conveyor.

The clinker is transferred by belt conveyor to its storage area in the raw material building. From this storage it is rehandled by the overhead crane to the finish mill feed bins. The clinker, along with gypsum, is proportioned on Merrick Feedoweights to the finish mill feed belts. As noted earlier, the finish milling circuits are identical to the raw milling flow, with the exception that there is no flow of hot air to the classifiers.

The finish mills have virtually the same ball load as the raw mills, *i.e.*, 30 tons of 2- and 3-in. balls in the primary compartment. However, the secondary compartments are charged with 1-in. balls.

Finished cement passing the classifiers at a Blaine fineness of 3,200 is tranferred *via* Airslide to a group of three cement pumps, and is then transported through an 8- or a 6-in. line to the plant storage silos beside the packhouse, or through an 8-in. line to the dock silos, where lake freighters are loaded. Each of the plant silos has a 15,000-bbl. capacity, while each of the two dock silos

CUT CRUSHING COSTS THIS WAY



Pennsylvania Reversible Hammermill

Nearly everybody knows that in many cases the Pennsylvania Reversible Impactor is the most economical and efficient mill for secondary crushing. But there are cases where the Pennsylvania Reversible Hammermill gets the call over the Impactor. This cousin to the Impactor also does a large amount of stone reduction by impact. (Note upper half of crushing zone above.) So when the pre-crushed material drops to the bottom of the mill there is a minimum of abrasive crushing action on the cage bars. This saves money. Also the expense and room needed for a closed circuit system is saved. Reversibility eliminates turning of hammers. Adjustable cage assures constant tonnage and uniform product for entire life of hammers and cage bars.

Pennsylvania Reversible Impactor

Pennsylvania Crusher Division
Bath Iron Works Corporation
West Chester, Penna.

PENNSYLVANIA CRUSHERS

Enter 113 on card, page 211

Dust Collection Performance is what you buy from Norblo

We haven't introduced a "new model" for many years!

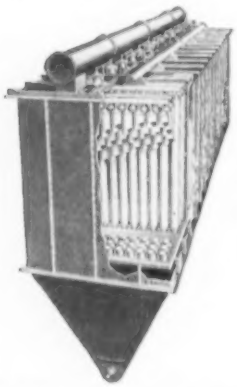
Yet Norblo Dust and Fume Collectors are completely modern—up to date. We keep them that way. And we've found it isn't the *model* that interests users . . . it's the *performance* of the equipment we recommend.

Outwardly, Norblo Equipment of several types *appears* to be just about the same as it was a quarter century ago. (There isn't a need to "stylize" these facilities.) But Norblo engineering — mechanical elements — materials and special components — all undergo constant scrutiny and testing. When improvement possibilities are discovered they are adopted at once — no waiting for next year's model!

Norblo engineers study to improve efficiency, add to equipment life, and reduce maintenance trouble and expense. Our repair parts business is terrible! (Low, that is!)

For 45 years Norblo Equipment has supplied outstanding dust arresting and recovery service for the cement and rock products industry. Norblo's "Cement Cooling in Production" process (Patented) achieves remarkable results in hundreds of American and foreign mills.

We are proud of our association with, and our opportunity to serve this important and far-reaching industry.



The Northern Blower Co.
6407 Barberton Ave. • Cleveland 2, Ohio
Telephone OLympic 1-1300

Known wherever cement is made, Norblo Automatic Bag Type Dust Collection plus Norblo Cement Air Cooling System (Pat. No. 2,350,737) combines two separate functions necessary for modern cement manufacture in one installation of maximum efficiency. Write for Bulletin 165.

Norblo ENGINEERED DUST COLLECTION SYSTEMS FOR ALL INDUSTRIES

Enter 114 on card, page 211

has a capacity of 20,000 bbl.

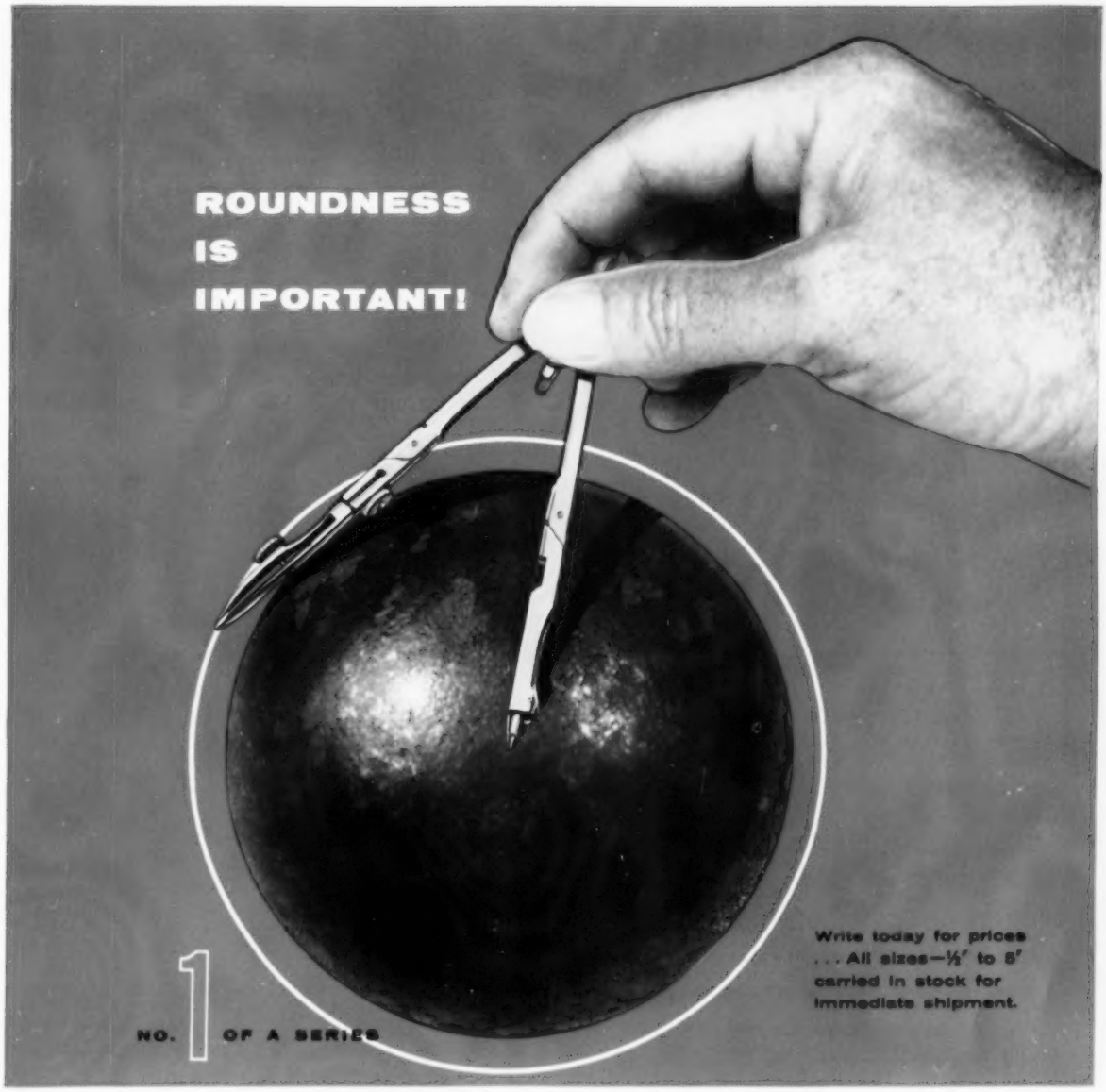
Bagging operations in the packhouse are handled with a 4-spout St. Regis packer. Bagged products, currently all Type I cement, may be loaded onto trucks or rail from either side of the packhouse. Bulk loading of both rail and highway carriers is also possible with Airslides and spouts on one side of the silo group. At the dock silo installation, a system of Airslides (19- and 16-in. units) can deliver cement to the holds of lake freighters at the rate of 3,000 bbl. an hour.

Freighter shipments are made to packing and distributing points in Toronto, Ont., and Rochester, N. Y. Installations at these points are similar and consist of a packhouse and four 25,000-bbl. storage silos at each location. The unloading equipment at both is designed to handle self-unloading freighters which can be emptied at the rate of 2,000 bbl. per hour.

With the mill at Picton and a distributing point at Toronto, the company can market its product throughout a substantial part of the province of Ontario. From the Rochester facility, where imports are expected to reach an estimated 160,000 tons of cement annually, an eight-county area extending south as far as the Pennsylvania state line can be serviced. This distribution is handled by the Rochester Portland Cement Corporation, an affiliate of the Lake Ontario firm.

Overall operation of this unusual cement and commercial aggregate production facility is headed by Mr. Anderson, general manager. Quarry and stone plant operations are under the supervision of Elmer French, a veteran quarryman with 50-odd years of experience. In the cement mill, W. C. Durie is plant mechanical engineer, and R. E. McMillan is plant electrical engineer.

Chief chemist is H. C. Brown, who has a background of over 30 years of experience in cement production in Canada. W. D. Adam, master mechanic, has had very wide experience in his field. Canadian sales manager is J. A. Pearce, whose sales office is at 10 St. Mary Street, Toronto. U. S. sales manger is W. H. Jagels, in charge of the sales office at 361 Boxart Street, Rochester.



The more perfectly round a grinding ball is the better it grinds and the longer it lasts—deviations reduce its efficiency. Coates has established a reputation for the roundness of its Carbex Triple-Forged Grinding Balls which dates back to 1918 when they patented a process for the first round grinding ball. Great care and skill are employed in the manufacture of these superior products. More perfect sphericity assures you a ball that wears evenly and grinds better, longer. Continued checks and calibrations throughout the manufacturing process protect the high standards and assure uniformity.

Coates Carbex Grinding Balls are made of fine-grained, high-carbon steel. Scientifically heat treated to the core, they are hard, to last longer and to grind better; tough, to avoid shattering under stress of milling. Call for Coates Triple-Forged Carbex Grinding Balls . . . built with care for longer wear.

COATES STEEL PRODUCTS CO. CARBEX TRIPLE-FORGED BALLS

COATES STEEL PRODUCTS COMPANY

GREENVILLE, ILLINOIS

LARGEST EXCLUSIVE MANUFACTURER OF GRINDING MEDIA

Research-Cottrell

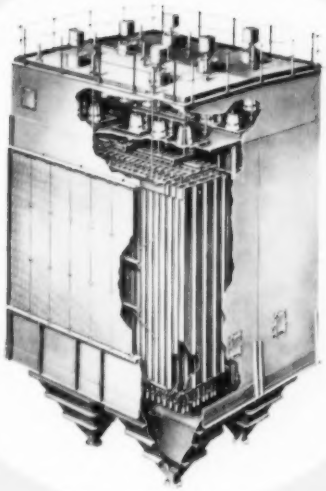
makes all three

3

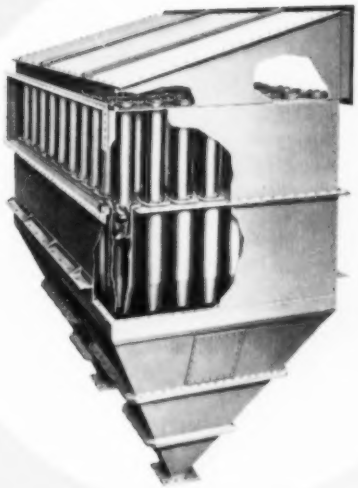
All three Research-Cottrell dust collectors are engineered for specific cement dust applications. Research's experience as the world's largest manufacturer of precipitators is well known—over 2000 installations in many different industries • In addition to straight precipitators, Research-Cottrell also offers electrical-mechanical combination units and Cyclo-trell mechanical collectors. Cyclo-trells are available in both 10-inch and 24-inch tube sizes. For more information on Research-Cottrell's line of dust collecting equipment which has been engineered for the cement industry, write for Bulletin PC.

Research-Cottrell

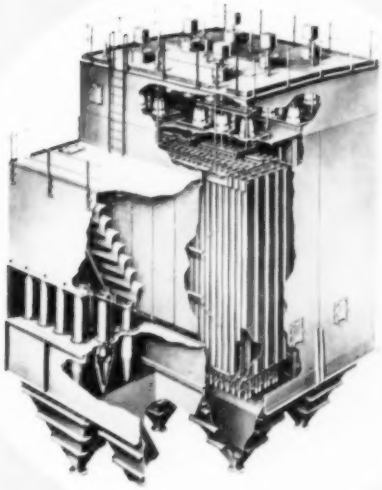
RESEARCH-COTTRELL, INC. Main Office and Plant: Bound Brook, N. J. • 405 Lexington Ave., New York 17, N. Y. • Grant Building, Pittsburgh 19, Pa. • 228 N. La Salle St., Chicago 1, Ill. • 58 Sutter Street, San Francisco 4, Calif. • Research-Cottrell (Canada) Ltd., 33 Bloor Street East, Toronto 5, Ontario.



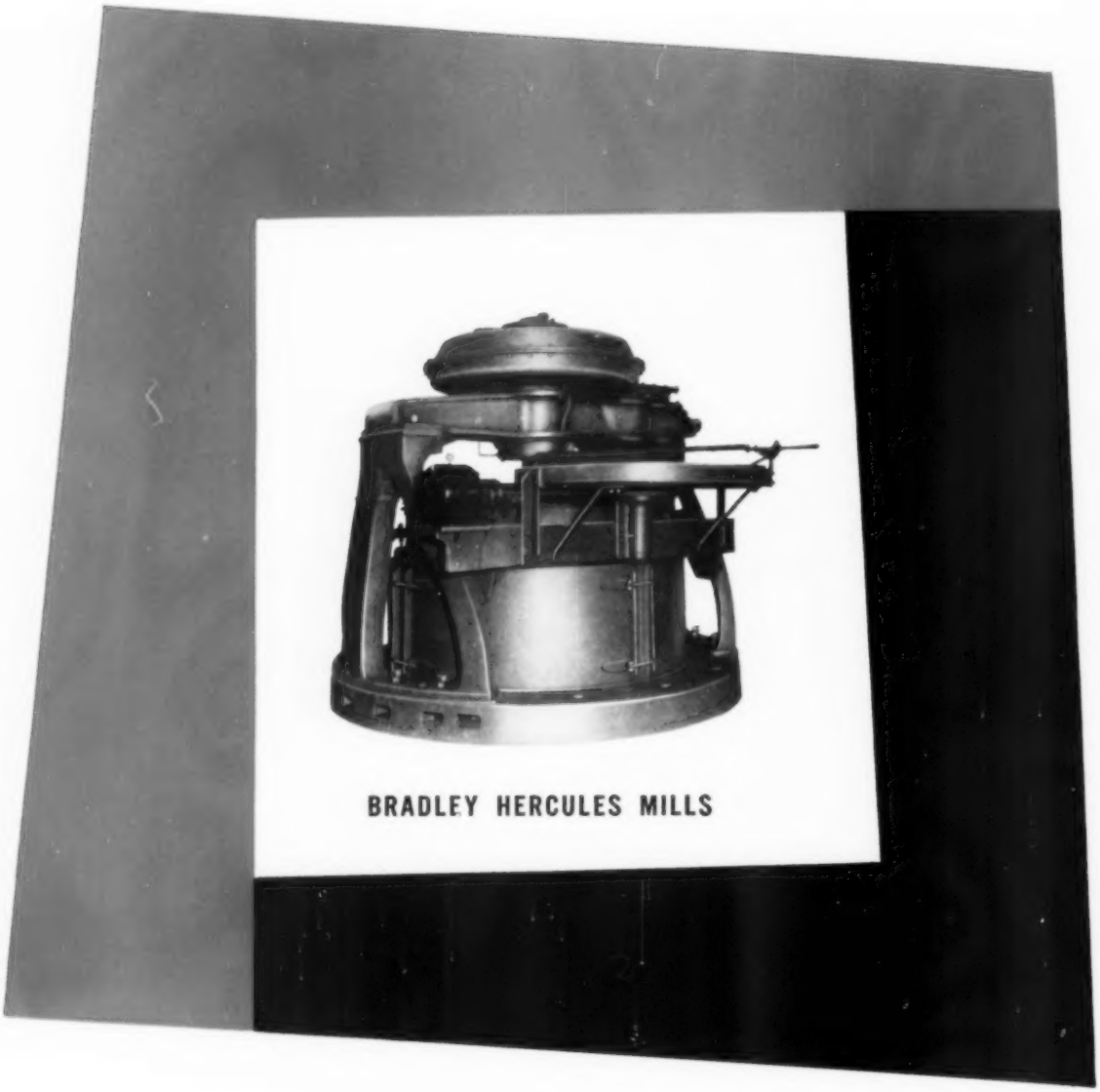
Cottrell
Precipitators



Cyclo-trell
Mechanical Collectors



Combination
Electrical-Mechanical
Collectors



HOW TO INCREASE CEMENT PRODUCTION UP TO 50%...

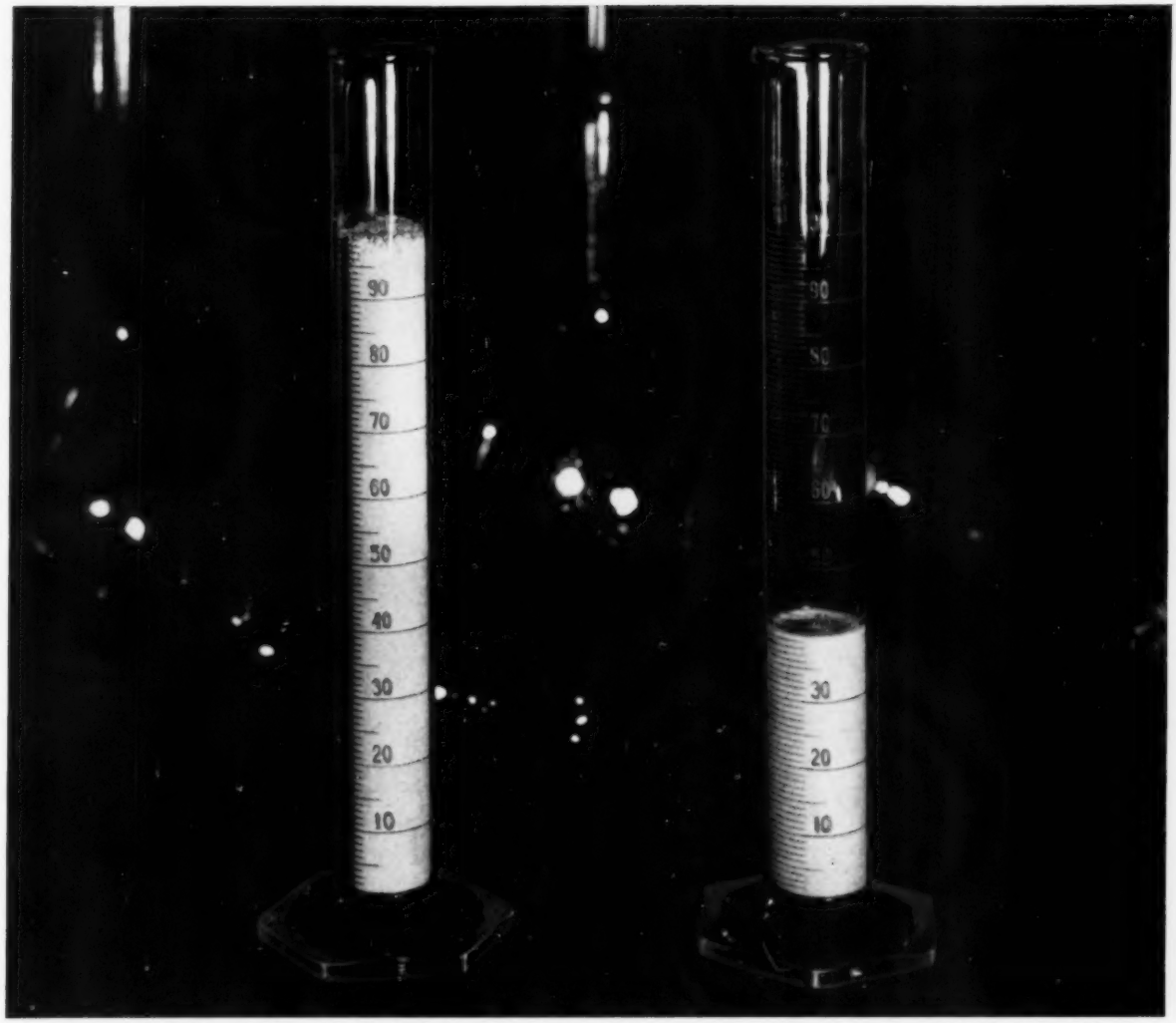
The capacity of an existing tube or compartment mill can be increased up to 50% or even higher simply by installing a Bradley Hercules Mill as a preliminary pulverizer on either the dry raw or finish side. Yet this increased production of cement raw material or finished cement is obtained at no increase in horsepower consumption per ton or barrel produced. The Hercules automatic electrical feed control eliminates manual operation. Rugged construction . . . dustless operation . . . easy accessibility to grinding parts keep maintenance costs at an absolute minimum. That's why so many in the cement industry rely on the Hercules Mill for increased production of finished material.

See Chemical Engineering Catalog or for complete information, write for Catalog No. 63

BRADLEY PULVERIZER CO. LONDON ALLENTOWN, PA. BOSTON

superior grinding equipment since 1891

BIG BENEFITS FROM SLURRY



Monsanto TSPP and STP make this difference: Graduate at left contains fine solids in powder form. Graduate at right contains same amount of fine solids in slurry form, yet requires only 40% of the storage capacity needed for powder.

You can save money by moving fine solids as slurry instead of dry powder

By slurrying you can get:

LOWER TRANSPORTING COSTS as well as greater capacity for existing storage tanks or lower tank costs for net units.

BETTER BLENDING. Slurries using Monsanto TSPP or STP for dispersion offer more complete blending and uniformity of product.

FUEL SAVINGS. Production increases on drying operation mean reduced fuel costs for total output.

How TSPP and STP increase solids content: Small amounts of Monsanto TSPP or STP added to the slurry reduce the consistency so that more solids may be added without changing the original pumpable viscosity. Hence, solids content is increased without reducing rate of movement, and the total capacity of existing equipment becomes greater.

Get all the facts on slurry handling efficiency. If you process 100,000 tons of finely divided solids such as ferrous and nonferrous ores, clays, cement, vegetable fibers, chemicals and industrial wastes, it's to your company's advantage to investigate slurry moving systems with Monsanto TSPP and STP. Include a description of your process when you write to Monsanto at above address.

MONSANTO CHEMICAL COMPANY
Inorganic Chemicals Division
Technical Service Dept.
St. Louis 24, Missouri

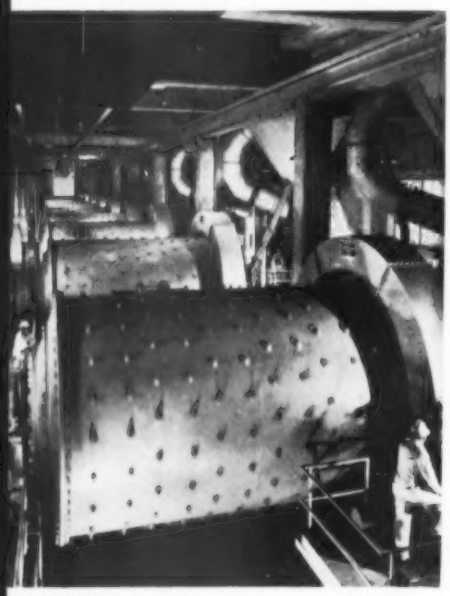
Monsanto®

Where Creative Chemistry Works Wonders For You

An aerial view of Lone Star Cement Corporation's plant at Nazareth, Pa., showing new kilns and other departments (left background).

Modernization at

This view in mill room shows the three raw mills (foreground) and the five finish mills, all 11- by 16-ft. 10-in. units. Each mill is in closed circuit with a 16-ft. separator (right).



By WALTER E. TRAUFFER

ANOTHER ON THE SPOT REPORT

THE Lone Star Cement Corporation late in 1957 completed a three-year modernization and expansion program at its Nazareth, Pa., plant which increased its capacity 1,300,000 bbl. annually to 3,600,000 bbl. The replacement or improvement of various departments also greatly increased efficiency and economy of operation. Major changes in this dry-process operation included replacement of three existing kilns with two large ones, lengthening and modernizing two additional kilns, complete new raw- and finish-grinding facilities, and complete replacement of the old cement dust recovery system by one combining gas conditioning with mechanical and electrostatic collection.

The first step in this program, completed in October, 1955, was the new 800-t.p.h. crushing and screening plant in the quarry, which included a primary crusher and two secondary crushers. This installation was followed by a new 180-t.p.h. raw mill department, including storage bins and a feeding system, in August, 1956, a new 700-bbl. per hour finish mill department and clinker silos in October, 1956, raw material homogenizing tanks in October, 1957, two new kilns and related equipment in October, 1957, and the special electrostatic precipitators for all four kilns in November, 1957. A complete new 4,160-

raw and clinker feed to separators, conditioned kiln dust collection are unusual features in Nazareth modernization

Lone Star's Nazareth Plant

and 460-volt electrical distribution system was also installed, and many other refinements were made.

The old grinding system consisted of two preliminary and four finish ball mills in the raw department, and three preliminary and eight finish mills in the separate clinker-grinding department. The raw mills were replaced by three 11-ft. dia. by 16-ft. 10-in. ball mills fed through 16-ft. separators. Each of these is grinding 175 bbl. per hr. to a fineness of 95 percent passing 200-mesh. The finish mills were replaced by five 11-ft. dia. by 16-ft. 10-in. ball mills, also fed through 16-ft. separators. Each of these units has a capacity of 115 to 135 bbl. per hr., grinding Type I cement to a fineness of 3,300 sq. cm./gm. Blaine, or Type III ce-

The crushing department in quarry with 708-ft. long conveyor to storage building at right. In back of building is the elevator for personnel and supplies.

In the foreground is the enlarged stone storage building, with conveyors from the quarry. In the right background is the kiln building, with the four new combined mechanical-electrostatic collectors.

General layout of Lone Star's plant at Nazareth, where an expansion program added 1,300,000 bbl. to the annual output.

ment at 75 bbl. per hr. to a fineness of 5,000 sq. cm./gm.

These grinding circuits are identical except for the hot air furnaces for drying in the raw air separators. The finish mills are operated in off-peak hours. All the mills are in one long room and are served by a single overhead crane. Control of the eight mills is simplified by the individual illuminated flow- sheet-type control panels provided for each grinding unit.

Prior to this program the five old kilns (three 9- by 8- by 100-ft., and two 11-ft. 3 in. by 175-ft.), produced 6,000 bbl. of clinker daily. The three smaller kilns were dismantled completely and the 175-ft. kilns were extended to 270 ft. in length. These are now kilns No. 4 and 5. The two new 11-ft. 3-in. by 300-ft. kilns are designated No. 2 and 3. The combined capacity of all four kilns is now 10,000 bbl. daily.

All of the old kilns were equipped with mechanical-type dust collectors, which were discarded in this program. The two new kilns and the two older extended kilns are now equipped with identical collectors of a new type, consisting of gas conditioning towers and combination mechanical-electrostatic precipitators. Each of these collectors is designed to handle 120,000 c.f.m. of conditioned gas with an overall efficiency of 98 percent. This new dust-collecting system features complete automation, with automatic feedback control replacing the usual manual adjustment and control.

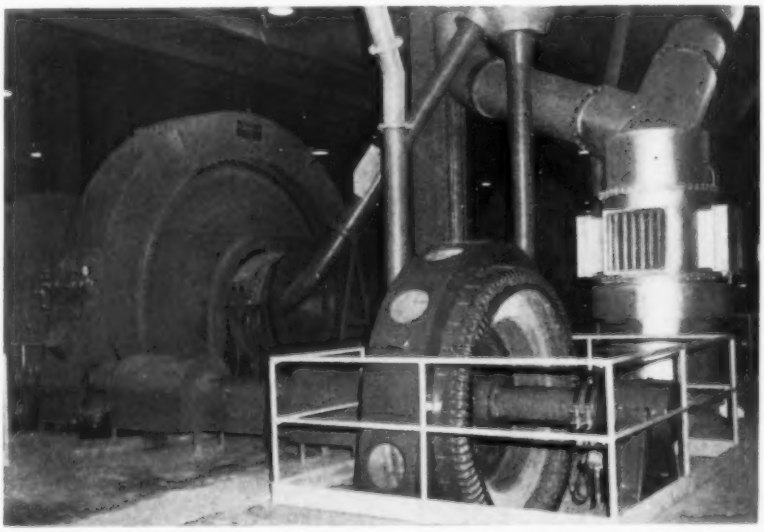
RAW MATERIAL PREPARATION

Blending The first blending of the limestone used in this plant is in the quarry, where there are low- and high-lime faces. Usually a rough blend is made by the number of truckloads hauled from these faces to the crushing department. Belt conveyors No. 5, No. 6, and No. 7 discharge a three different places in the storage. The rough-blended rock is discharged at the middle, and the low- and high-rock at the ends. No blending is done in the storage.

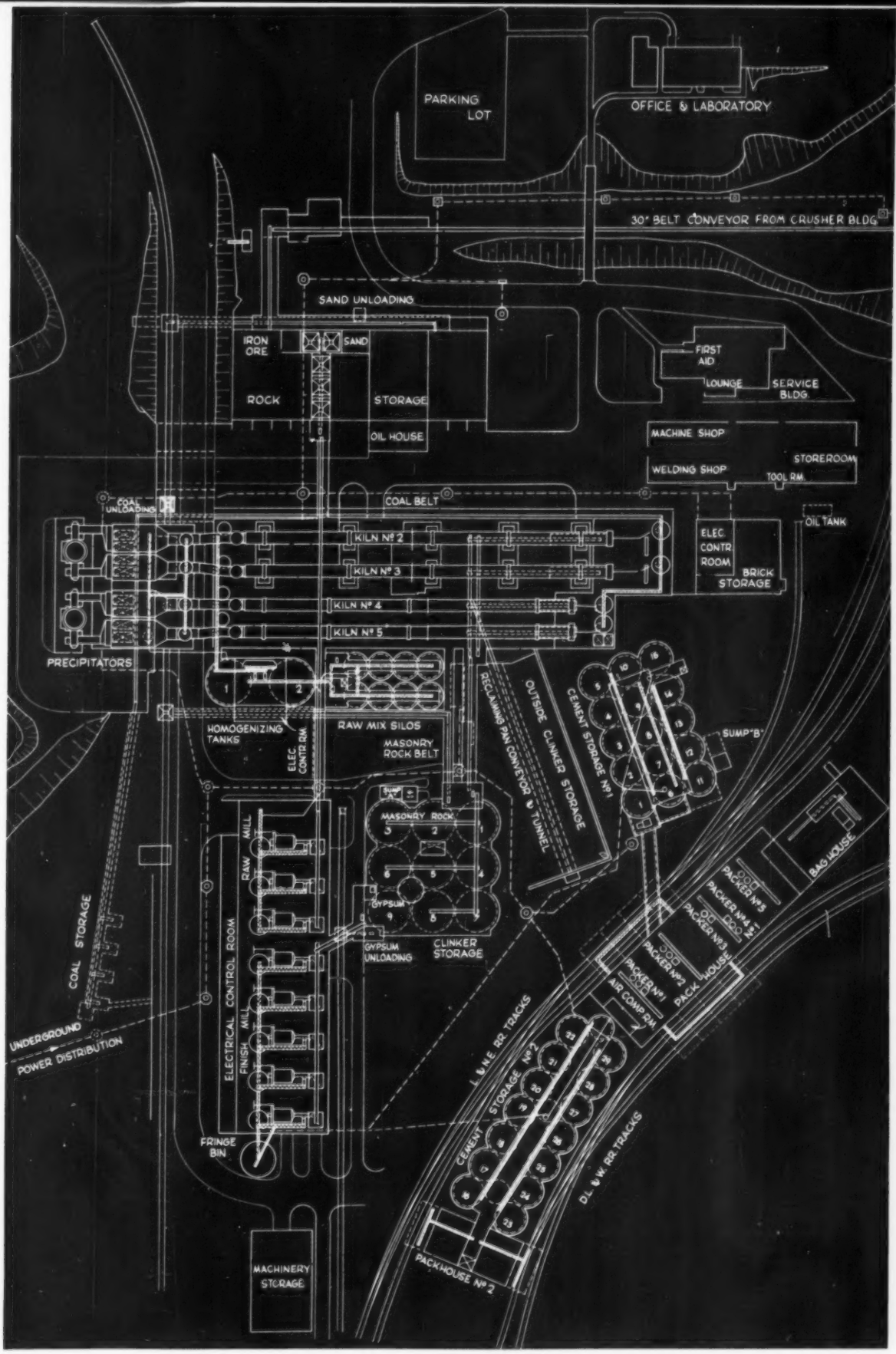
Stone, iron ore, and sand are placed in large feed bins arranged centrally across the storage building. There are Merrick Model WS Feedoweights under each of the ore, sand bins. Usually only the ore, sand, and blended rock are needed; the low- or high-lime rock is used only if the blend is running too high or too low.

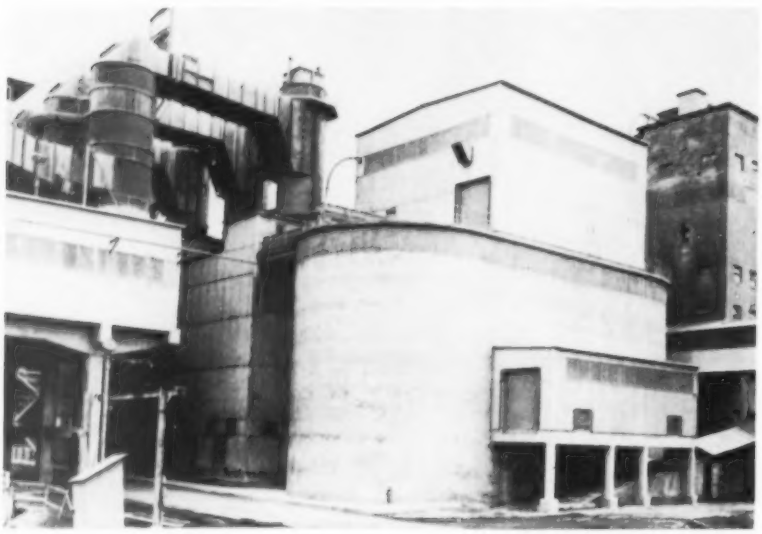
These feeders discharge to an 18-in. by 72-ft. Kensington drag-chain conveyor, followed by a bucket elevator. The latter discharges on a 24-in. by 306-ft. belt conveyor which carries the rock to the mill building. There a short 18-in. drag chain discharges into the three 35-ton raw mill feed bins. Under each bin is a Hardinge Size C, long-type constant-weight feeder. Each discharges to a bucket elevator and a J. D. Christian twin-screw conveyor which discharges into a 16-ft. Sturtevant separator in the three identical raw mill circuits.

Drying and Grinding Drying of the rock is done in the separators. Each has a Todd thermo-direct-fired hot-air generator nominally rated at 10,000,000 B.t.u. per hr. and capable of heating 11,000 c.f.m. of air from 0 to 800 deg. F. No. 6 fuel oil is used. The outlet of each furnace leads through two ducts to the in-

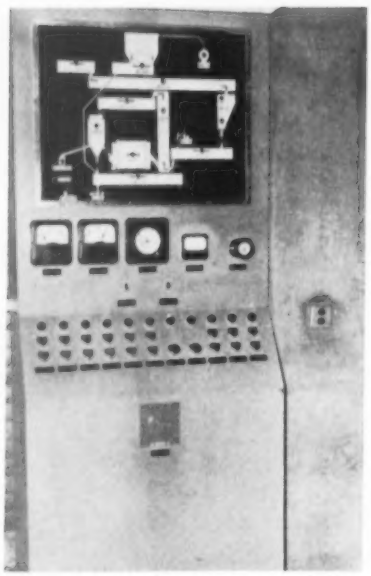


One of the 11- by 16-ft. 10-in. raw-grinding mills with the separator (above), drying furnace, and 1,000-hp. motor (at right).


PARKING LOT
OFFICE & LABORATORY
30" BELT CONVEYOR FROM CRUSHER BLDG.
SAND UNLOADING
IRON ORE
SAND
ROCK
STORAGE
OIL HOUSE
FIRST AID
LOUNGE
SERVICE BLDG.
MACHINE SHOP
WELDING SHOP
STOREROOM
TOOL RM.
COAL UNLOADING
COAL BELT
OIL TANK
KILN Nº 2
KILN Nº 3
KILN Nº 4
KILN Nº 5
ELEC. CONTR ROOM
BRICK STORAGE
PRECIPITATORS
HOMOGENIZING TANKS
ELEC. CONTR. RM.
RAW MIX SILOS
MASONRY ROCK BELT
RECLAIMING PAN CONVEYOR & TUNNEL
OUTSIDE CLINKER STORAGE
CEMENT STORAGE Nº1
SUMP "B"
SUMP "A"
MASONRY ROCK
GYPSUM
GYPSUM UNLOADING
CLINKER STORAGE
RAW MILL
ELECTRICAL CONTROL ROOM
FINISH MILL
COAL STORAGE
UNDERGROUND POWER DISTRIBUTION
FRINGE BIN
MACHINERY STORAGE
PACKER Nº5
PACKER Nº4
PACKER Nº3
PACKER Nº2
PACKER Nº1
AIR COMP. RM.
PACK HOUSE
BAG HOUSE
I. U. N. E. RR. TRACKS
CEMENT STORAGE Nº2
D. L. & W. RR. TRACKS
PACKHOUSE Nº2



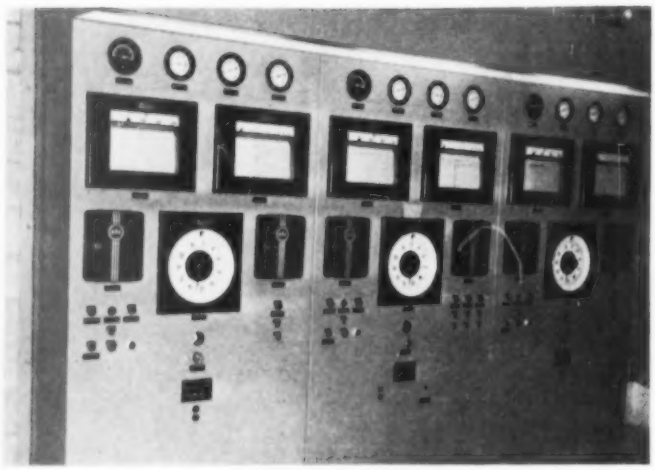
Above: The two 37-ft. diameter, 6,000-bbl. capacity raw-material homogenizing tanks which insure a thorough intermixing of the blended materials.

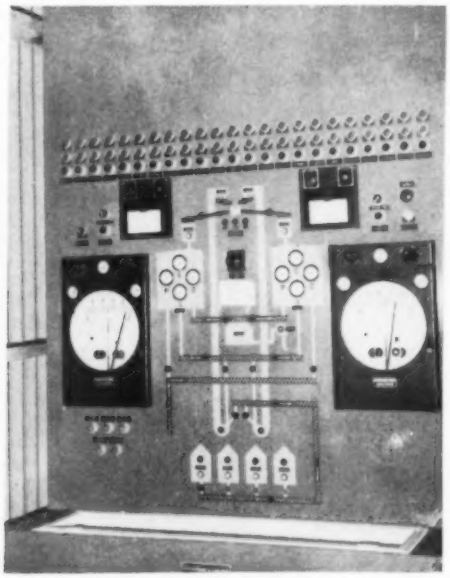


Left: Each of the three raw mills and five finish mills has an individual panel control board with a diagrammatic flowsheet of the entire grinding circuit.

Below, right: The control panel for the two raw material homogenizing tanks has a diagrammatic flow diagram, a selector for any of four sequences of operation, etc.

Below: Each of the eight mills also has an individual board with indicators, recorders, ammeters, pushbuttons, etc. The three raw mill boards are grouped in a convenient location.





side cone of its separator, and this counterflow of hot air dries the rock as it falls through the separator. The average moisture in the raw material during 1957 was 1.11 percent and in the dried material 0.15 percent.

The separator tailings are fed to the ball mill; and the entire discharge of the ball mill goes to the rock elevator, where it mixes with the raw rock going to the separator. The entire system is vented from the air separator to a Norblo dust collector and to atmosphere. The twin screws, separators, elevators, and dust collectors are all insulated.

The three 11- by 16-ft. 10-in. F. L. Smidth ball mills are fed and also discharge through their trunnions. They have U. S. Steel Lorain liners, and Coates Carbex steel grinding balls are used. The load consists of:

41,000 lb. of	1½	-in.	balls	
31,000 "	" 2	"	"	
25,000 "	" 2½	"	"	
21,000 "	" 3	"	"	
17,000 "	" 3½	"	"	

Each mill is drive at the rate of 18.3 r.p.m. by a 1,000-hp. GE synchronous motor. Each grinds 175 bbl. per hr. to a fineness of 95 percent through 200-mesh. This is being done with an input of 605 lb. of raw material per bbl., fuel oil consumption of 0.48 gal. per ton, and mill motor input of 850 kw.

Control Each of the raw and clinker mills has an individual panel control board with diagrammatic flow sheet of the entire grinding circuit. This flow has indicator lights which give the operator a quick picture of conditions at any time. Also on the board are all the starters, indicators, lights, ammeters, feeder controls, etc. Each flow is completely interlocked. Each mill drive has a Farval automatic lubricating system.

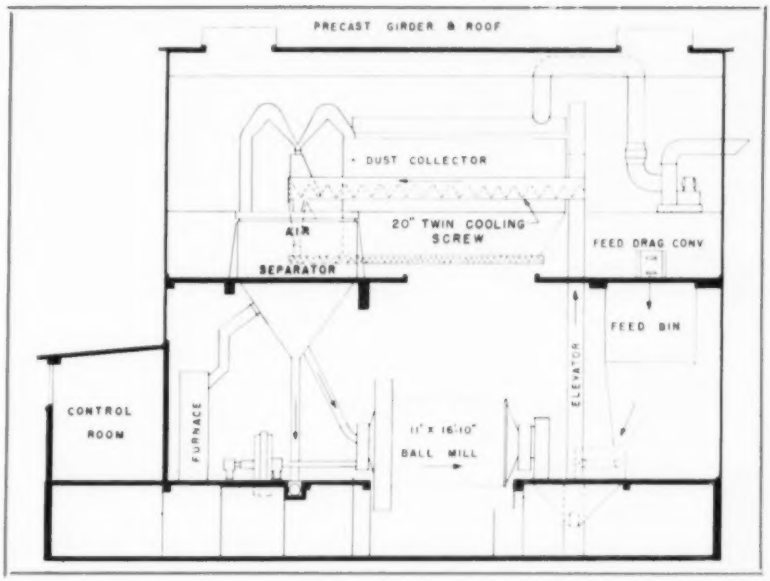
Storage The finished raw material from the three separators is carried by screw conveyor to a 10-in. Fuller-Kinyon pump. It can be delivered either to the raw material blending silos, or direct to the homogenizing tanks if the mix is nearly perfect. Each of the eight 20-ft. dia. blending silos is equipped with an alleviator and has a capacity of 2,700 bbl. These silos are fed one at a time and tested when filled. The desired mix is then blended out of as many tanks as necessary.

BURNING AND COOLING

Homogenizing The blended raw mix is pumped to one of two 37-ft. I. D. Fuller homogenizing tanks—each with a capacity of 3,500 bbl.—which assure a thorough intermixing of the blended materials. These are standard installations with porous pads in the bottom to admit compressed air. One quadrant of a tank is agitated at a time. Present practice is to use one tank and to keep the second in reserve for another type of raw mix.

Finished raw material is discharged from a tank through a constant-level feed box to a Fuller-Huron Airslide. A bucket elevator and screw conveyors discharge into the four 250-bbl. feed tanks for the kilns. From these tanks, screw feeders discharge to bucket elevators to constant-level kiln-feed boxes; the excess material overflows back into the tanks. Constant-level 18-in. dia. feed screws discharge through spouts to 12-in. dia. screw feeders inclosed in heavy cast-iron pipe. A G-E variable-frequency generator on the kiln drive operates the constant-level screw in synchronism.

A control board for the homogenizing tanks has an illuminated flowsheet type control panel and a selector for any one of four sequences of operation. There are also timer controls for rotation, pressure and tank level indicators, push-buttons, etc.



Elevation of one of raw grinding systems, showing the arrangement for drying raw material fed to the separator.

Kilns The two new Traylor kilns (No. 2 and 3) are 11 ft. 3 in. in dia. by 300 ft. long. They are of all-welded construction, with a slope of ⅜ in. per foot and are mounted on five tires. Each is driven by a 100/125-hp. G-E d.c. motor through a Falk gear reducer. An International auxiliary gasoline engine can be connected *via* a small Falk reducer to the high speed shaft of the main reducer. There is a Farval automatic lubricating system for the spur and ring gears. The kiln has an articulated hood, so that the front can slide out for access to the interior of the kiln. The entire hood can be rolled back when major work has to be done.

The kiln lining, beginning at the nose ring, consists of 4 ft. of Harbison-Walker "Dean" 6 in. Super Duty hot zone brick, 30 ft. of 6-in. 70 percent Alusite, 30 ft. of 6-in. 60 percent Arco (General Refractories), 90 ft. of 6-in. Dean Super Duty, and 142 ft. of 6-in. High Heat Duty cold zone H-W Special.

Clinker Coolers Clinker is discharged from each kiln to a Fuller inclined-grate cooler. The two new coolers are 6 by 44 ft., and the two older ones 6 by 25 ft. They are offset from the centerline of the kiln, so that the falling clinker hits the center of the cooler grate. Standard equipment includes a chain curtain, a Dietrich suspended ceiling, a hammermill-type breaker, and armor plate at the discharge end to catch any ricochet from the breaker. Under-grate pressure is furnished by a fan with individual ducts to the three chambers. Cooler excess air is drawn by a fan through a Multiclone collector and then exhausted through a stack. Each breaker is equipped with a Farval automatic lubricating system.

Individual 12-in. drag chains under each of the four coolers feed the clinker and the collected dust to 18-in. collecting drag chains, each serving two kilns. One of these can feed to either the silos or the storage building; the other feeds only the silos. Seven of nine 35-ft. dia. by 85-ft. high conical-bottom silos—combined capacity, 112,000 bbl.—are used for clinker storage.

Coal Coal received in cars is discharged into a track hopper and carried by belt and screw conveyors to the coal mill feed bins. The two new kilns are fired by Raymond No. 493 bowl mills and the two older kilns by Babcock & Wil-

SINCE 1835
McLANAHAN

Reciprocating Plate

FEEDERS

Get All the Facts from this New Feeder Bulletin
No. FRE-157

Designed to handle all materials from sand to shovel-loaded rock . . . these units are the most efficient means of feeding uniformly-controlled quantities of materials to crushers, washers, conveyors and other machinery. In addition to providing substantial savings in material handling costs . . . these feeders lower repair and production costs by eliminating choke-ups, spills, overloads on motors and drives, wear and tear on machinery. Easily adjustable eccentric, force-feed lubrication.

McLANAHAN & STONE CORPORATION
PIT, MINE AND QUARRY EQUIPMENT HEADQUARTERS SINCE 1835
253 Wall Street, Hollidaysburg, Pennsylvania

cox mills. The new mills are grinding 3.6 t.p.h. to 90 percent passing 200-mesh. Drying air is drawn from each Fuller cooler through a Multiclone collector and with automatic bleed-in of cool air. The mill outlet temperature of 180 deg. F. is the controlling temperature for the bleed-in damper. The 13-in. I. D. burner pipe is water jacketed. There is a suspension ring at the kiln hood for adjustment, and a saddle support farther back also provides for adjustment of angle.

Exhaust Gases Exhaust gas from each of the four kilns goes to new Research-Cottrell dust-collecting units, each consisting of gas conditioning towers and combination mechanical-electrostatic precipitators. Each of these units is designed to handle 120,000 c.f.m. of conditioned gas with an overall efficiency of 98 percent. Installations of the same size are used on all four kilns as the older kilns may later be extended to the same length as the new ones.

Each gas-conditioning system consists of a 10-ft. I. D. by 96-ft. vertical dust chamber with horizontal breeching to a 10-ft. dia. by 40-ft. conditioning tower. The 1,400 deg. F. kiln exit gas is cooled by water spray and atmospheric air dilution to 600 deg. F. The water treatment also conditions the dust particles and decreases their resistivity, resulting in increased collection efficiency in the precipitator.

The tower breeching connects to a Cyclo-trell mechanical collector which scalps the low-alkali coarse particles and returns them to the kiln feed. This is an integral part of the shell of the electrical precipitator. A small amount of cold air is bled in through a dilution damper to control the temperature to the precipitator.

From the precipitator the gases flow through vertical and horizontal ducts with a louvre damper ahead of the fan. The chambers and towers and the cross flues are lined with gunite insulating refractory.

Each of the conditioning towers has seven water sprays—in banks of 2, 3, and 2. These are controlled by the temperature at the precipitator and come on in sequence at full pressure as the temperature

Enter 126 on card, page 211

rises. The first bank has sprays of the greatest capacity. After all the sprays are in full effect, the bleed-in air automatically takes final control. In ordinary operation all the sprays are on continuously, and the air varies to keep conditions uniform. Fine mist sprays are used at 250 lb. pressure, which also keeps the nozzles clean.

As previously stated, the sprays cool the gases and provide the required amount of moisture for highest collection efficiency. Best results are being obtained using about 8 percent of water by weight.

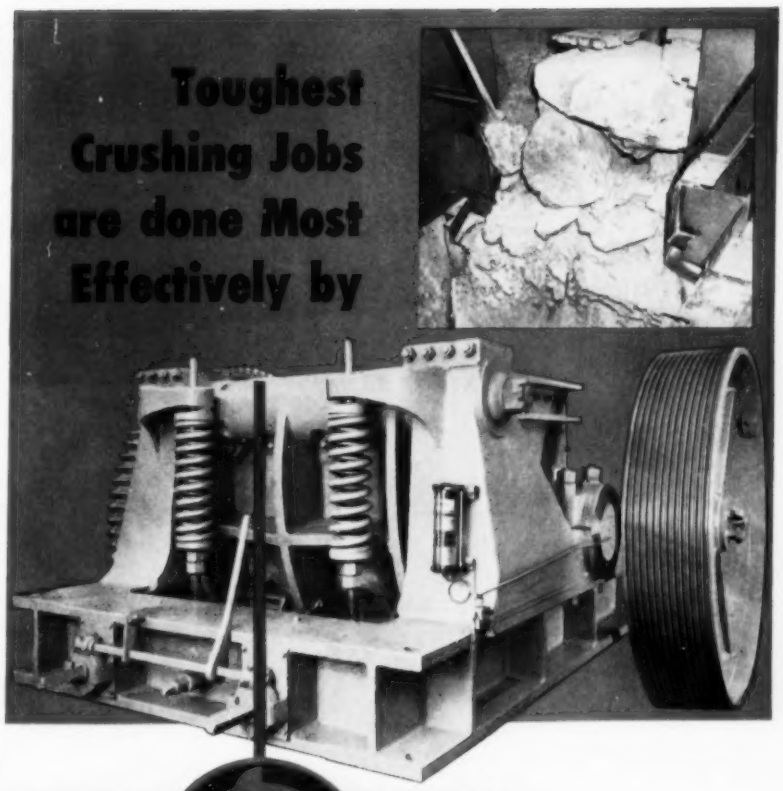
The Cyclo-trell mechanical collector for each kiln has 30 cyclone tubes 24 in. in dia. This unit reclaims coarse dust which, with any fallout from the tower, goes to a screw conveyor. A Fuller-Kinyon pump returns this material to the homogenizing tanks.

Each of the Research-Cottrell electrical precipitators is a 29-duct unit designed to clean 120,000 c.f.m. of gases at 600 deg. F. The precipator discharge wires and collection plates are both equipped with electrically-powered rappers. This dust, totalling 10 tons per kiln per day, is presently wasted.

The Buffalo Forge draft fans are rated at 130,000 c.f.m. at 600 deg. F. and are driven by 250 hp. G-E motors. The brick-lined concrete stacks were built by the Rust Engineering Company. They are 227 ft. high, 12-ft. 8-in. I. D. at the base, and 10-ft. at the top.

As previously stated, these electrostatic gas cleaning systems feature complete automation of their power supplies. Complete automatic feedback control replaces manual adjustment and control of high voltage inputs. Manual and visual electrical controls are replaced by continuously acting feedback servo-circuits. With this system the precipitator is placed in operation by a single start-stop switch for all rectifiers. These electronic circuits continuously maintain rectifier power output at the optimum level necessary for highest performance under all conditions.

Kiln Control The control board for each kiln has all the usual equipment, plus that for the precipitator system. The left section—panel 1—has a



SINCE 1835
McLANAHAN

ROCKMASTERS

- Steelstrut Toggle automatically protects against damage from uncrushable materials.
- Will handle wet, frozen, sticky, muddy materials.
- Continuous crushing—can be choke-fed without primary grizzleys or screens ahead.

High-capacity Rockmasters provide best economy in the most rugged crushing applications. Efficient for primary and secondary crushing, Rockmasters have been proved outstanding on many materials—including limestone, various ores, cement rock, coal, gypsum, hard shale and all similar materials. Low headroom, automatic lubrication and roller-bearings on countershaft.

Get All the Facts from this New Technical Data Bulletin No. RMTD-56

McLANAHAN & STONE CORPORATION
PIT, MINE AND QUARRY EQUIPMENT HEADQUARTERS SINCE 1835
283 Wall Street, Hollidaysburg, Pennsylvania

Enter 127 on card, page 211

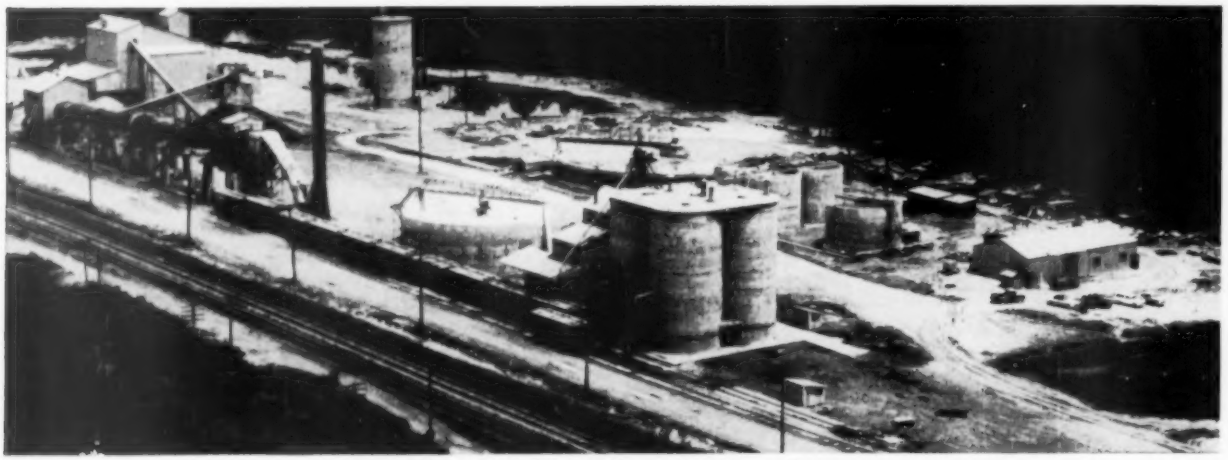
KENNEDY

for high output and quality product...

This Chilean 4500 barrel-per-day plant was designed and completely equipped by KENNEDY VAN SAUN. The wet process, and separation by flotation were adopted to cope with the high silica content of the raw material.

Cemento Cerro Blanco de Polpaico, Chile.

This wet process plant uses shell as the principal raw material to produce 1800 barrels per day of high grade cement. Construction cost was kept to a minimum by KENNEDY design and through the use of KENNEDY equipment.



Texas Portland Cement Corporation, Orange, Texas.

KENNEDY cement plants *in every part of the world* are economically producing quality cement, in many cases from difficult-to-process raw materials. KENNEDY engineers have repeatedly solved many difficult physical problems yet have kept investments well within the strictest budgets.

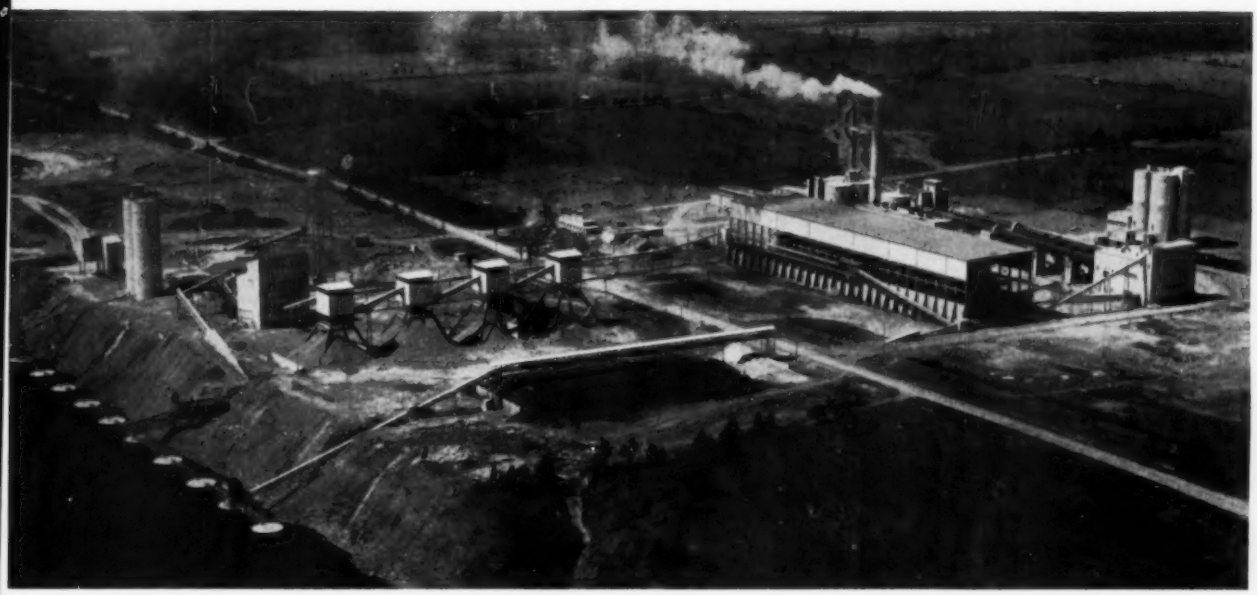
These four cement plants are typical of the many KENNEDY designed and equipped installations throughout the world. The name KENNEDY has long been associated with the finest in cement plants—plants which produce a quality product with maximum efficiency.

Consult KENNEDY *for your next cement plant.*

PRIMARY & SECONDARY GYRATORY CRUSHERS • JAW CRUSHERS • ROLL CRUSHERS • IMPACT BREAKERS • HAMMER MILLS

Cement Plants

...at maximum economy



Lake Ontario Portland Cement Company, Picton, Ontario.

This entire dual-purpose plant was designed and major equipment supplied by KENNEDY. This newest of Canada's plants produces over 5000 barrels of cement per day by the dry process as well as 600 tons per hour of aggregate.

Cementos California, Ensenada, Mexico.

This 1500 barrel per day, dry process cement plant is another example of the economy of construction possible with KENNEDY design and equipment. It is the latest addition to Mexico's growing cement industry.

KENNEDY VAN SAUN

MANUFACTURING & ENGINEERING CORPORATION

405 PARK AVENUE, NEW YORK 22, N.Y. • FACTORY: DANVILLE, PA.

KENNEDY *Research and Testing Service*

ROD & BALL MILLS • KILNS • DRYERS • SCREENS • CONVEYORS • COMPLETE CRUSHING, LIME AND CEMENT PLANTS.

Minneapolis-Honeywell recorder and controller for the water sprays and the final air damper, indicating lights, etc.

Panel 2 has recorders for the gases leaving the kiln and at the stack, and for the hood and back end draft.

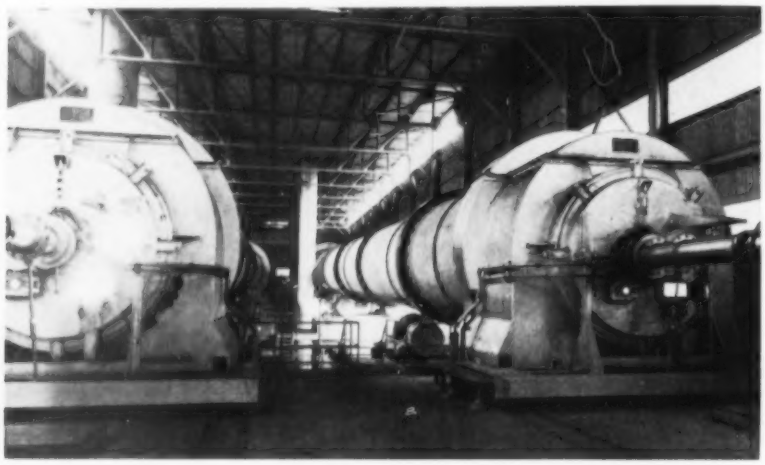
Panel 3 has a Brown Radiomatic hot zone temperature recorder and the kiln speed indicator and controller.

Panel 4 has a Hays oxygen analyzer and revolution counters.

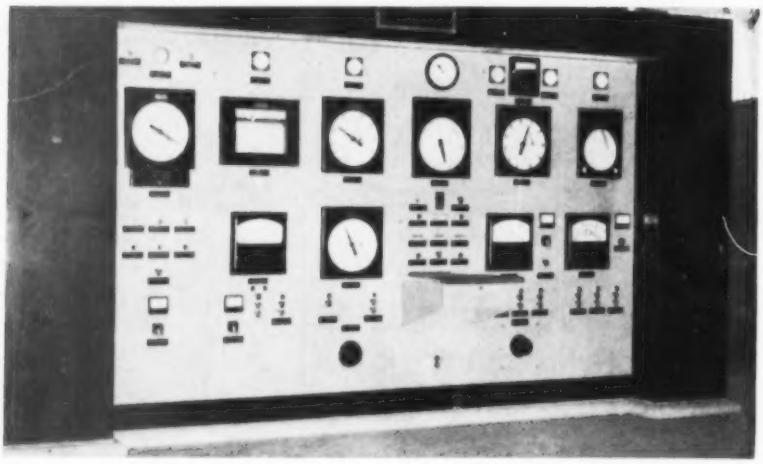
Panel 5, for the cooler, has recorders for cooler bed and excess air temperatures, and indicators for undergrate and excess air pressure.

Panel 6, for the coal mill, has a temperature indicator and controller which controls the bleed-in damper and the pressure drop across the mill and across the orifice in the pressure duct.

In operating these kilns the kiln speed is held constant at from 43 to 46 r.p.m., with an average of 45 r.p.m. The burning zone temperature is held beween 2,500 and 2,600 deg. F. by means of the Radiomatic recorder. The 0_2 content is held between 1½ and 3 percent by the Hays oxygen analyzer which is also watched to see that it is in balance with the air from the coolers, etc. Hood draft is held at minus 0.10 in. The temperature of the air entering the coal mills is controlled to hold the coal-air outlet mixture at 180 deg. F.



The two new 11-ft. 3-in. by 300-ft. rotary kilns have articulated hoods, so that only the front need be rolled back when minor work has to be done in the kiln.



This control board for one of the two new kilns has all the necessary recorders, controllers, indicators, etc. for the kiln and those for its gas conditioning and dust collecting system.

The cooler excess air damper is automatically controlled by the motor load on the excess air fan. On the precipitators the water sprays and the dilution air damper, and through these the precipitator air inlet temperatures, are held automatically. The kiln exit gas temperature averages 1,300 deg. F. and the cooler excess air 300 to 400 deg.

There are three separate alarms in each system. One has a red light to show when cooler excess air temperature goes over 500 deg. F. Compensation is made manually. A thermocouple at the kiln induced-draft fan sounds an alarm and blinks a light when the temperature goes over 750 deg. F. The coal mill feeder is automatically stopped. When the temperature of the gases entering the mechanical precipitator exceeds 60 deg. F., a thermobulb connected to a pressure switch lights a red light and also stops the coal feeder. These last two checks guard against damage in case of secondary combustion in the precipitators.

There are switches at the tail shaft of each clinker drag chain conveyor which stop the motor in case of plugging.

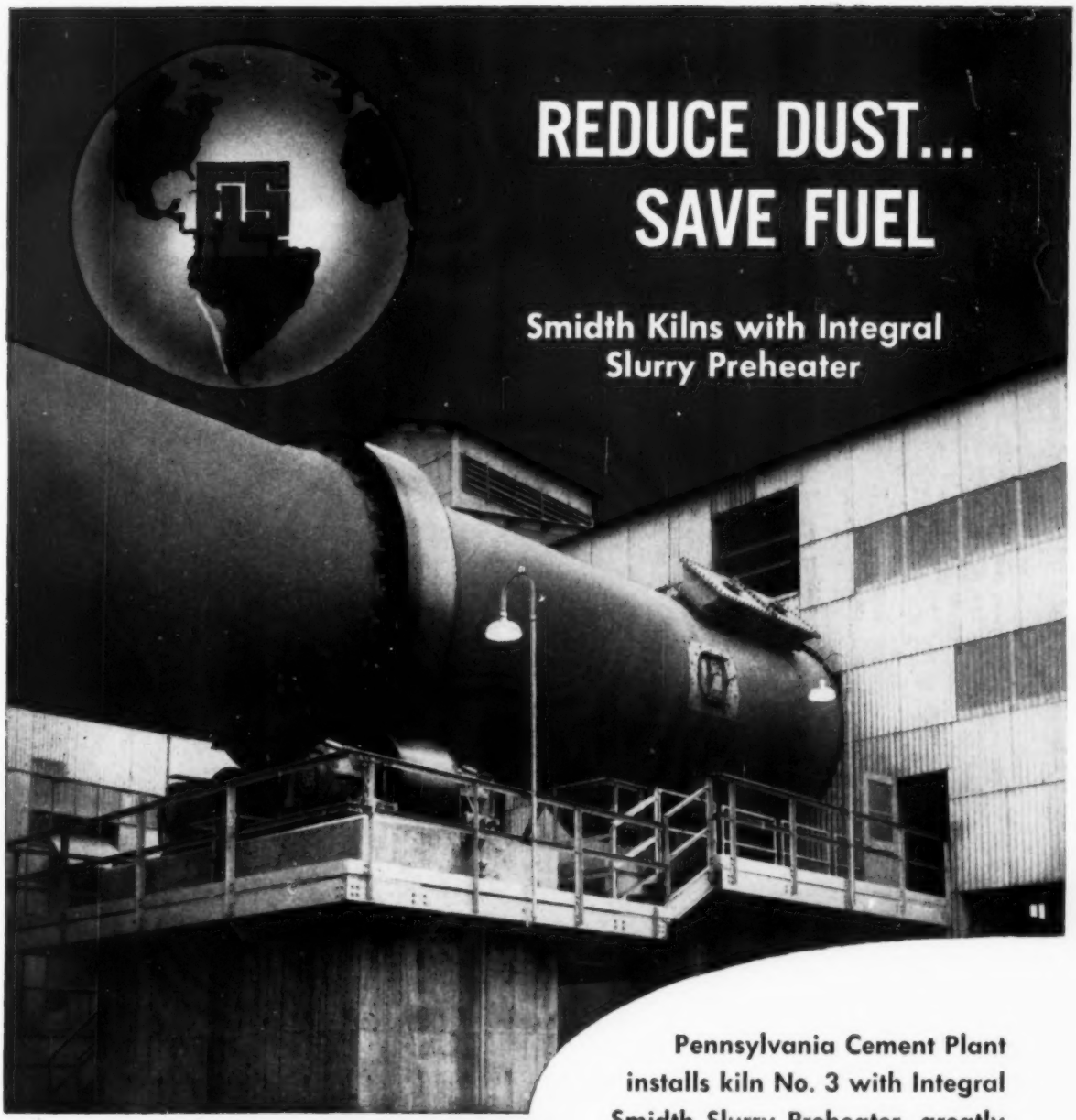
Clinker Grinding Clinker is reclaimed from the seven silos and gypsum rock (and masonry rock) from the other two silos by Merrick Feedoweights, and transported to elevators by a series of drag chain conveyors. The elevators discharge to five J. D. Christian twin screw conveyors 20 in. in dia. by 40 ft. long. Additives, including Vinsol resin are mixed in a special room and measuring pumps add these materials to the clinker at the elevators.

As in the raw department, feed is to the separator in each mill circuit, a new departure for Lone Star as far as finish mills are concerned. This was done to permit a simple symmetrical mill building and installation to reduce the amount of conveying and elevating equipment and to minimize the number of spare parts required. To make this system function correctly, it was necessary to omit the air separator distribution plates and provide essential baffles; otherwise coarse

(*Continued on page* 153)

REDUCE DUST... SAVE FUEL

Smidth Kilns with Integral Slurry Preheater



Pennsylvania Cement Plant installs kiln No. 3 with Integral Smidth Slurry Preheater, greatly reducing dust loss and fuel consumption.

Smidth

F. L. Smidth & Co., A/S
77 Vigerslev Alle
Copenhagen, Denmark

F. L. Smidth & Co.
11 West 42nd Street
New York 36, N. Y.

F. L. Smidth & Co., Ltd.,
105, Piccadilly,
London, W. 1, England

F. L. Smidth & Cie France
80 Rue Taitbout
Paris (9e) France

F. L. Smidth & Co. of Canada, Ltd.
11 West 42nd Street
New York 36, N. Y.

F. L. Smidth & Co. (Bombay) Private Ltd.
42 Queen's Road
Bombay, India

22-Year Record

375 UNITS since 1936

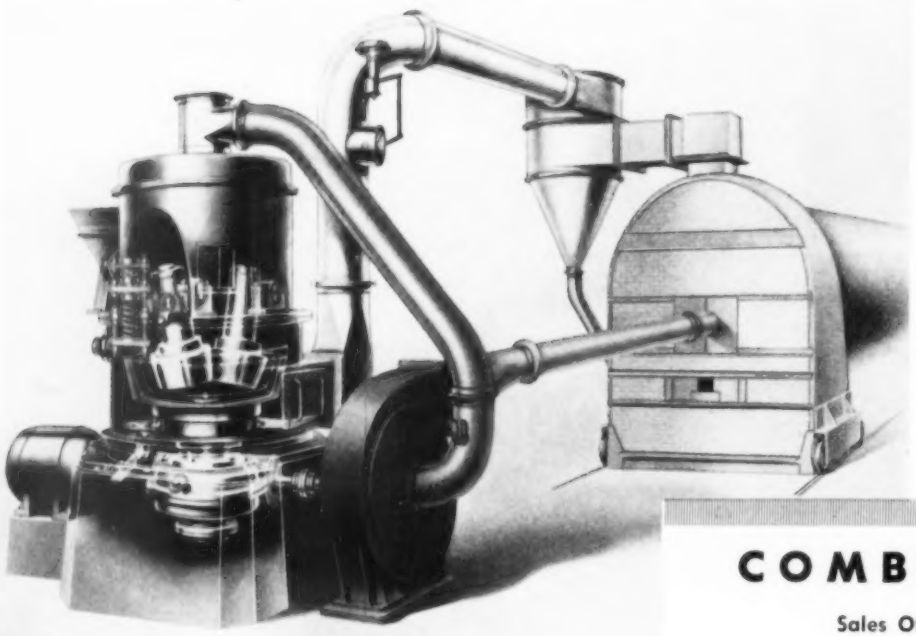
THE development of Raymond *Bowl Mill firing* is another success story of modern industry. Its continual growth in popularity right up to the present date is based on its dependable performance for the past 22 years.

The first experimental Bowl Mill was tested and proved under actual service conditions in 1935. The year 1936 marked the beginning of wide-spread acceptance of the Bowl Mill for direct firing rotary kilns.

The opposite page shows the rapid climb in yearly Bowl Mill output, measured in tons of coal pulverized.

From the original units installed in 1935, the list has grown to 375 mills at the end of 1957. Rated capacity has increased to more than 18½ million tons of coal per year, used in kiln firing alone.

The continued leadership of the Raymond Bowl Mill is a proof of its ability to lower over-all costs and to insure top-level efficiency in kiln operations.



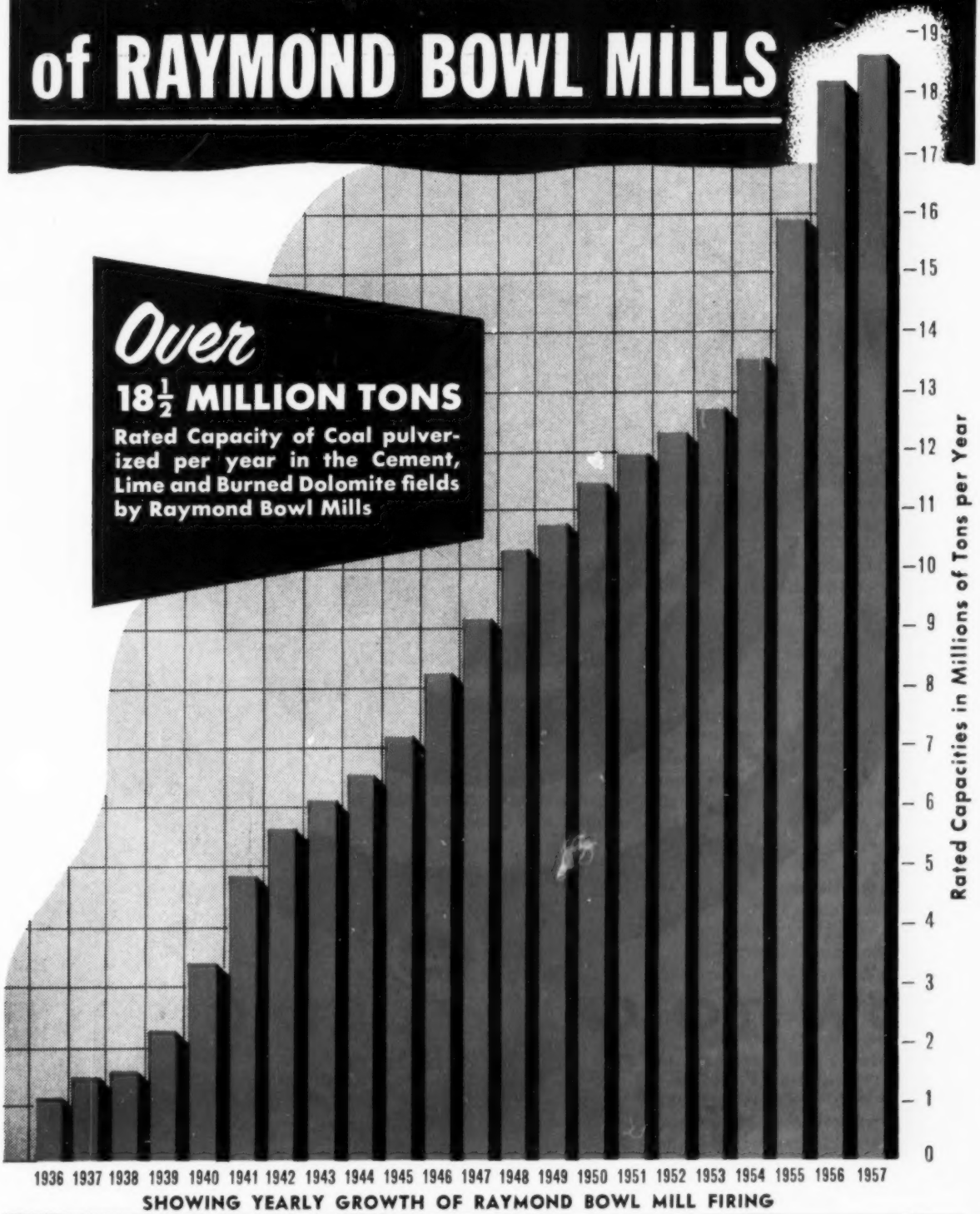
The Raymond Bowl Mill provides a complete fully coordinated system of coal pulverizing and direct firing for rotary kilns in production of lime and cement.

For further details, ask for Raymond Bowl Mill Catalog #75

COMBUSTION

Sales Offices in Principal Cities

# of RAYMOND BOWL MILLS


Over
18½ MILLION TONS
Rated Capacity of Coal pulverized per year in the Cement, Lime and Burned Dolomite fields by Raymond Bowl Mills
Rated Capacities in Millions of Tons per Year
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
1936 1937 1938 1939 1940 1941 1942 1943 1944 1945 1946 1947 1948 1949 1950 1951 1952 1953 1954 1955 1956 1957

SHOWING YEARLY GROWTH OF RAYMOND BOWL MILL FIRING

ENGINEERING, INC.
RAYMOND DIVISION
1321 North Branch St., Chicago 22, Illinois

Combustion Engineering-
Superheater, Ltd.
Montreal, Canada

BOWL MILL

Bull's-eye performance means more cement and fewer upsets.

HOW TO CUT FUEL COSTS
of rotary kilns

1. Measure and record *oxygen* and *combustibles* in kiln exit gases. These factors directly affect fuel costs.

2. Reduce oxygen (excess air) until a trace of unburned fuel begins to show up in the exit gases.

3. Provide the burner with a reliable combustion guide—*% oxygen* and *% combustibles* on the same chart. Then a single glance shows the burner that he is holding maximum combustion efficiency.

To increase overall kiln efficiency let a Bailey Engineer help you plan for *bull's-eye* performance . . . or for additional information write for a BAILEY KILN CONTROL FOLDER. C-11

BAILEY METER COMPANY

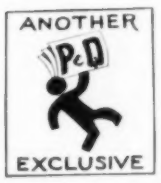
1051 IVANHOE ROAD • CLEVELAND 10, OHIO

In Canada—Bailey Meter Company Limited, Montreal

BAILEY METERS

Phosphate Slurry Thinner Used At Keystone Portland's Bath Plant

J. P. ALLEN
Chief Chemist,
Keystone Portland Cement Co.
and
J. W. LYONS
Research Chemist, Monsanto Chemical Co.



CHEMICAL treatment of raw slurries handled in the wet-process manufacture of portland cement has been largely aimed at improving the slurry pumping characteristics or increasing the percent of solids in the slurry. Flocculants have been used successfully in settling basins or thickeners, and dispersants or deflocculants have received considerable attention as so-called "slurry thinners." In the latter group, sodium polyphosphates, refined sulphite waste liquor products, sodium silicate, and sodium carbonate have been investigated by many, most attention going to the phosphates and sulphite waste liquor products.

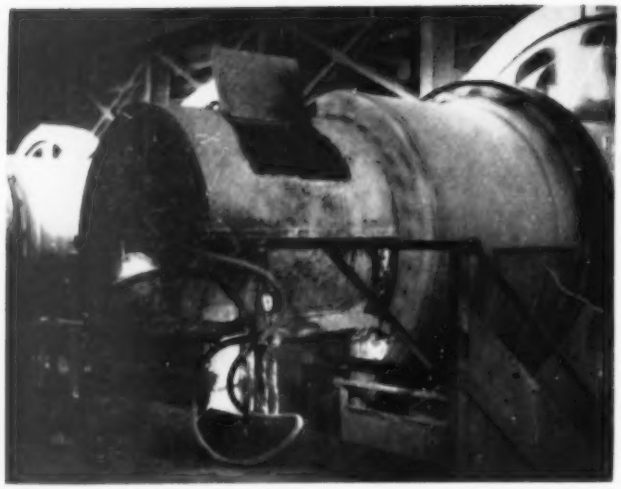
In some cases, plant trials have been set up to demonstrate the advantage of handling a deflocculated slurry of higher solids content; and currently there are a few plants running on a continuing basis using, for the most part, one of the sodium polyphosphates as the deflocculant.

Although a dramatic reduction in slurry viscosity can be shown with most raw slurries when a deflocculant is added in the laboratory, the continued reluctance of many cement producers to try slurry thinning is probably due to the fact that past trials have not pinned down conclusively the effect of the treatment on all parts of the process.

The Portland Cement Association has evaluated slurry thinners in its laboratory and has encouraged cement manufacturers to investigate the possibility of obtaining better fuel economy and a greater production rate by the use of chemical treatment of slurry. Yet a well documented trial has not been available which can provide the answers to many questions cement manufacturers have raised concerning the effects on chain sections of the kilns, possible difficulties in slurry storage, etc.

Therefore it was determined to run a trial at Keystone Portland Cement Company's Bath, Pa., plant. It was decided to spend as much time and effort as necessary in order

Delivering sodium tripolyphosphate to the solution preparation tank.



Left: The discharge end of one of the raw mills.

Above, right: Slurry discharge from one of the raw mills.

Right: Close control is maintained throughout the process. Here a laboratory technician is checking slurry viscosity and pH.

to evaluate thoroughly the slurry thinning process. Several trials had been made previously in the industry in which too many variables were changed too quickly and failure accepted far too soon. A constant check was maintained throughout the process in both plant and laboratory. Several possible bottlenecks were overcome as quickly as they arose by means of a close working relationship between Keystone and the phosphate producers.

Anticipated Benefits The trial was designed to test, in the best possible manner, the claimed advantages for deflocculation. When a sodium polyphosphate is added in small amounts to a raw cement slurry, the apparent viscosity is markedly reduced. In order to return to the original apparent viscosity, more solids are added to the slurry; often an increase of 10 percent is required. The net result is that the plant is able to pump and handle a slurry at a higher solids content without affecting the slurry voscosity. The advantages which should automatically accrue are: (1) greater storage capacity for raw ground solids, (2) less fuel burned per barrel (less water to drive off), and (3) greater production rate (same kiln feed volume contains more solids).

Also, the addition of polyphosphate to the slurry mills should result in increased grindability. Improved grindability should lead to an increased fineness which, in turn, could yield a higher raw mill production rate.

In handling the denser slurry, close watch was to be kept for its effect on tank agitators, for settling difficulties, pipe plugging, effect on chains, nodule size and distribution, kiln temperatures, and kiln lining. Operating data were made available at all points for operation without chemicals, so that comparisons could be drawn.

Description of Plant The Keystone plant at Bath (Figure 1) produces 3,000,000 bbl. per year by the wet process. The raw material is ground in four 7- by 42-ft., 3-compartment ball mills operated in open circuit. Past practice has been to hold the moisture content of the raw mill discharge at about 37 to 38 percent and fineness at about 88 to 90 percent passing the 200-mesh sieve. Each of the mills normally produces about 100 bbl. per hour. Control of rock feed is by table feeders. The feed water is regulated by individual Kates Flow Rate regulators, followed by surge tanks and sight gauges. Periodic slurry checks for each mill are made by the laboratory.

Slurry is pumped into storage and blend tanks and then into kiln feed tanks. Hold-up time in storage is rarely more than four days, and usually closer to two days. Slurry is fed from ferris-wheel feeders to the five kilns, without the addition of stack dust.

Four of the kilns are 250 ft. long, with varying diameters; three of these contain chain systems, and one

Cement clinker from one of the rotary kilns.

Left: A ferris-wheel bucket device feeding deflocculated slurry to one of the rotary kilns.

has tubes. The fifth and newest kiln is 350 ft. long; it has a chain system and an expanded diameter feed end, and has been in service for two years.

All kilns are coal fired from Raymond unit pulverizers. Merrick Feedoweight devices are employed to feed the pulverizers, providing an accurate means of calculating fuel consumption. Clinker from the four shorter kilns is cooled with three Fuller recuperator-type coolers and a Vanderwerp recuperator, while the larger kiln is cooled with a Fuller inclined grate cooler.

Finish grinding is acomplished in six 3-compartment ball mills, 80 percent of the production by open circuit, and the remainder in closed circuit with a 12-ft. Sturtevant air separator.

Laboratory Slurry Evaluation The proper amount of chemical deflocculant required for best results was first determined in the laboratory of Monsanto's Inorganic Chemicals Division. The raw slurry was placed in the cup of a Stormer Viscosimeter, and its apparent viscosity was determined through a range of driving weights so that the weight required for 300 r.p.m. of the rotating spindle could be determined. 300 r.p.m. was used as an approximation to the conditions found when slurry is pumped through a typical slurry pipe. The apparent viscosities for this speed on the spindle were then determined when various amounts of deflocculant were added.

Figure 2 shows a double set of curves obtained at two different times in recent years for Keystone's slurry. One curve in each set represents the consistencies obtained when sodium tripolyphosphate (STP) was used by itself. In each case, it will be seen that about 0.1 percent STP (solids basis) was required to reach a nearly level portion of the curve. The action of STP may be made more efficient, however, by adding sodium carbonate (Na_2CO_3). The carbonate removes much of the soluble calcium present in the system which otherwise would tie up some of the STP and render it less effective. Thus, in Figure 2, the second curve in each set shows the consistencies obtained when 0.5 percent Na_2CO_3 was added initially and subsequent additions of STP were made. Now only 0.06 to 0.075 percent STP was required to reach a relatively flat portion of the curves, and a mixture of 0.05 percent Na_2CO_3 and 0.075 percent STP is less expensive than 0.1 percent STP alone.

It was decided to evaluate further a mixture containing three parts by weight of STP and two parts of Na_2CO_3. It was necessary to determine fully the relations between slurry water content, deflocculant concentration, and apparent viscosity. The viscosity was determined at various water contents and at several levels of the 3:2 mixture of STP and Na_2CO_3.

The results are shown in Figure 3 as a family of curves, each of which represents the apparent viscosity obtained over a range of water contents with a fixed amount of the deflocculant. Thus, the upper right-hand curve shows the effect of water content on the apparent viscosity of untreated raw slurry. The other curves show the same effect when 0.01 to 0.12 percent of the deflocculant mixture is added. The heavy horizontal line represents the viscosity of the slurry as previously handled at Keystone. It was desired to maintain this viscosity by adding deflocculant as the moisture content was lowered.

Scheduling Figure 3 was used as a guide in setting up the schedule for the full-scale plant trial. The critical part of a trial is the

transition from the untreated to the treated condition, with the accompanying reduction in slurry moisture. This changeover must be accomplished gradually, so that the operators at all stages may become adapted to each new set of conditions before a subsequent change is made. Thus, a burner would be overwhelmed if he were suddenly asked to burn a slurry containing 8 or 10 percentage units less water. However, if he first handles 37 percent water, the next week 35 percent, the following week 33 percent, and so on, it is likely that he will get along with the minimum of difficulty. Hence, a gradual step-by-step changeover was set up in which about four weeks was allowed to reduce the slurry water from 37 to 38 percent to 31 to 32 percent.

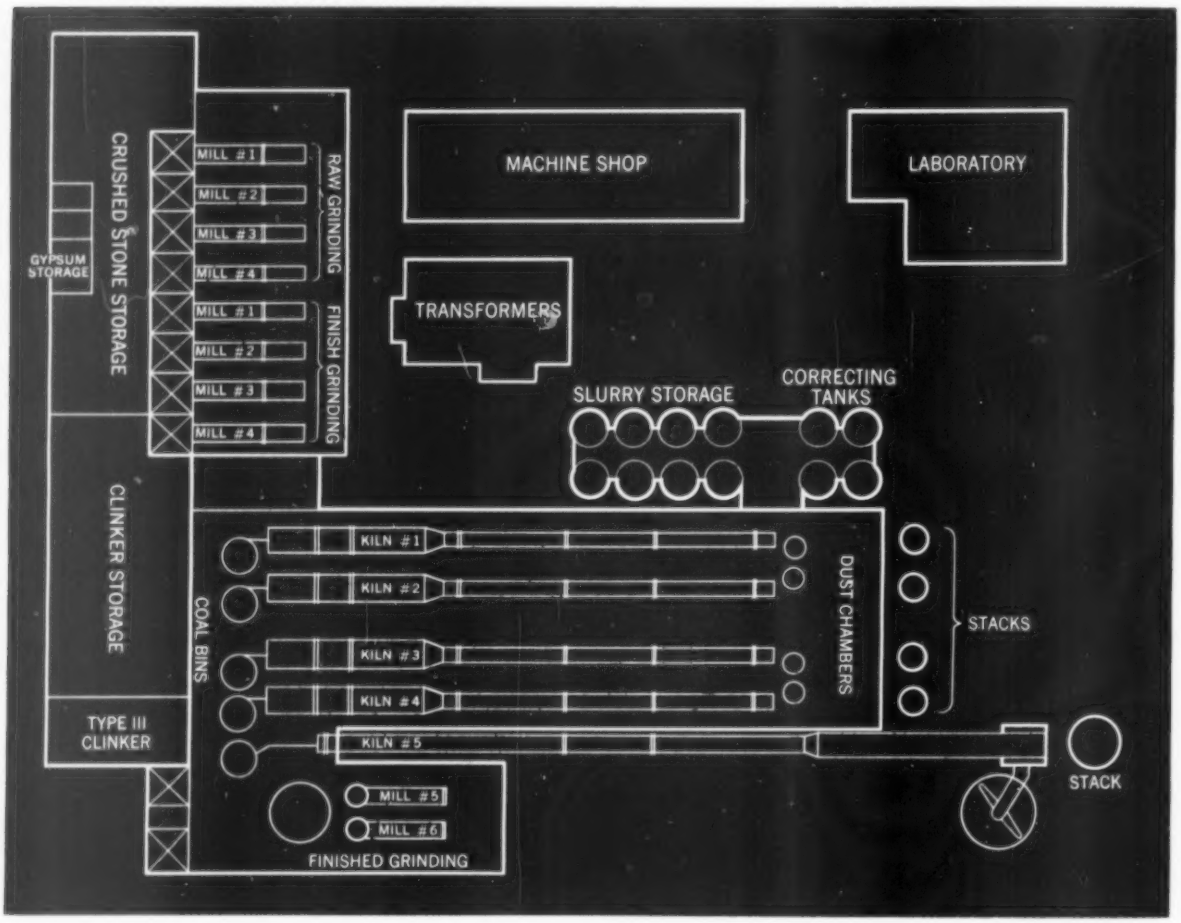
The desired procedure was to travel from right to left on the heavy horizontal line in Figure 3. This was to be done in four separate stages, each of about one week's duration. In the first week, slurry moisture was to be lowered from 37.5 to 35.5 percent, and chemicals were to be added at the rate of about 0.2 percent (solids basis). The change in water and chemical levels was to be carried out on the first day, and the remaining days were to be used to study the effect of the change, to adjust the process where needed, and to familiarize the operators with the new slurry conditions.

In the three following weeks the moisture was to be dropped to 34 percent, then 32.5 percent, and finally to 31 percent, while the chemical feed rate was to be raised to 0.03 percent, then to 0.05 percent, and then to the final level of 0.12 percent (of the 3:2-STP:Na_2CO_3 mixture). At each stage the system was to reach equilibrium before moving on to the next step. If some difficulty arose, it would be possible to delay the next step or return to an earlier stage, if necessary. Such a schedule was flexible and at no stage was there a "point of no return," *i.e.*, one could always add a little water or excess deflocculant to overcome any problems due to thickening of the slurry.

Calculations were roughed out which showed that, at the final condition of 31 percent water and 0.12 percent of the chemical mixture, the fuel savings per barrel would offset the cost of the chemicals; and at the same time there would be an increase in production of more than 11 percent. Having made these predictions, it was time to ready the plant for the trial.

Deflocculant Addition Solution feeding of the phosphate-carbonate mixture was felt to be more advantageous than dry solids feeding, particularly since both sodium tripolyphosphate and

Fig. 1—General plan of the Keystone Portland Cement Company's plant at Bath, Pa.



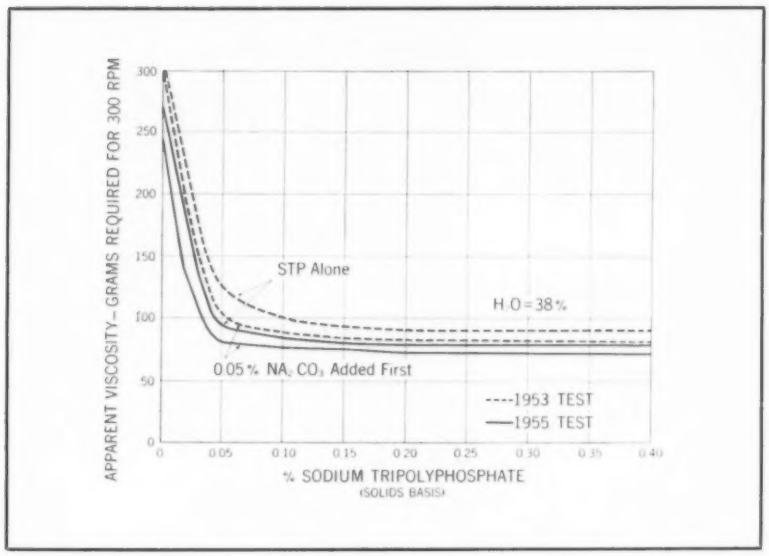


Fig. 2—Consistencies obtained when Na_2CO_3 was added initially and when subsequent additions of STP were made.

sodium carbonate are readily soluble in water. Unused equipment at the plant was well adapted to preparing the solution of two chemicals arriving from separate sources. Since it was possible to add the solution simultaneously with the main water stream at the feed end of the raw mills, thorough and rapid mixture of the rock and chemicals would be accomplished.

Also, the laboratory and plant personnel were familiar with solution-feeding in the finish - grinding department. Therefore it was easier to introduce the idea of slurry thinning by using a familiar method of chemical addition. The necessity of setting up a batching tank for preparing the solution of the chemicals was a disadvantage. There is no essential difference in handling costs; solution feeding confines the charges to the plant labor department, whereas dry feeding would distribute costs between the raw-grinding department and the labor department.

Before the deflocculant feeding equipment was set up, certain information was obtained in the laboratory. First, the solubility of a 3:2 mixture STP and Na_2CO_3 was determined at 3-4 deg. C. by adding STP hexahydrate and Na_2CO_3 in increments containing the proper ratio and stirring into distilled water. It was found that a solution containing between 13.7 percent and 14.2 percent of the 3:2 mixture could be obtained, and that this solution remained clear over the range between 3-4 deg. C. and 27 deg. C. To allow a reasonable margin of safety, it was decided to prepare a solution containing 10 percent of the mix (6 percent STP and 4 percent Na_2CO_3). The granular form of the chemicals appeared to dissolve most readily and was therefore selected.

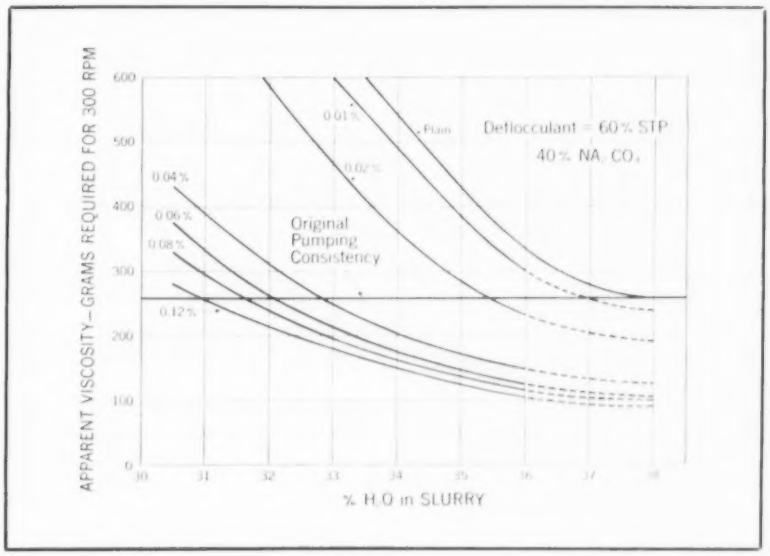
A simple control test involving a hydrometer was devised to ensure that proper strength was maintained in the solution. This hydrometer test was checked against wet chemical analysis and against solutions of known strength and was found to be accurate to about 0.1 percent, which was more than sufficient.

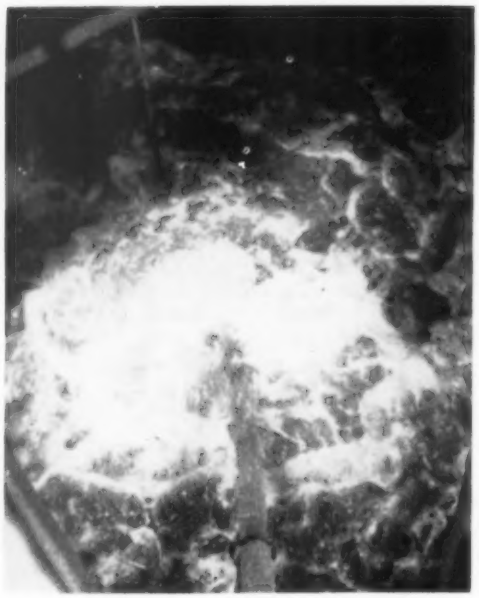
The 10 percent solution of the mixture of chemicals is prepared in 2,700-gal. batching tank. Mixing of the tank contents is done by air agitation and by circulation through a pump from a bottom outlet and back in through a pipe above the tank. About one-half hour is required for complete dissolution of the chemicals; the solution is then pumped to a 25,000-gal. storage tank. Batches are made on a daily basis to maintain the storage tank at least half full. (See Figure 4.)

Initially, metering of the solution into the raw mills was done by means of sight feeders with clear glass gauges. The solution was pumped to overhead surge tanks of about one-gallon capacity on each mill and then allowed to fall by gravity to each sight feeder. Rate of feed could be controlled by either changing the feeder orifice or by adjusting a stopcock above the feeder. Rate is checked by timing, with a stop watch, the delivery into a graduated cylinder. (See Figure 5.)

Trial The trial got under way as soon as the batching and metering equipment was installed. The raw miller was told to lower his water "aim" to 35.5 percent and at the same time the solution feeders were set to deliver 0.2 percent of the chemical mix to the mills based on

Fig. 3—Used as a guide in setting up the schedule for the full-scale plant trial.





Left: Fig. 4—From the solution preparation tank, the prepared solution, containing STP and Na_2CO_3, is pumped to the 30,-100-gal. solution storage tank.

Fig. 5—An operator checking the rate of feed of a deflocculant solution to a raw mill.

the weight of rock fed. After running about 24 hours, the solution rate was further adjusted until the slurry viscosity was about normal. Occasional readjustments in solution feed were made from day to day to account for rock fluctuations. It was found early in the trial that simultaneous lowering of the water "aim" and increase in solution feed to a fixed higher amount didn't always give the right viscosity, as predicted by the schedule. Therefore, after each lowering of the slurry water content, the chemical feed rate was brought up gradually until viscosity tests showed the rate to be about right. Deviations from the schedule occurred, but these were minor in nature. In the first stages more chemical was required than forecast, owing to viscosity increases due to rock changes and to increased fineness; but as the water content became steady at its lowest level, the chemical requirements approached the predicted levels.

Solution feed rate was checked several times each shift. The laboratory personnel responsible for sampling the mills took these measurements; and, knowing the solution analysis, they knew at all times how much chemical was being fed to the mills.

A continual check was kept on the process *via* the usual samples taken at mills, in the slurry storage and blending tanks, and from the chain sections of the kilns. From these samples and from tank measurements, temperature recorder charts, and other sources, information on the variables listed in Table I was constantly available.

Many of these variables are routinely recorded in all wet process plants, and the reasons for so doing require no explanation. Slurry viscosity was checked in two ways, and good correlation was found much of the time between Stormer and Target readings. At the lower moisture contents and higher deflocculant levels, the Target Viscosimeter tended to creep considerably, but it was considered a valuable aid.

Slurry pH was checked because it was found that large variations in pH are often indications of changing slurry viscosities due to factors other than water content. Maintaining a record of pH values enables one to catch possible difficulties with thick slurry before it becomes too severe. Data indicated in Table I were recorded as frequently as possible, some continuously, others hourly, but all on regular schedule.

Table I—Variables Recorded

1. Slurry H_2O content
2. Slurry fineness
3. Slurry wt./cu. ft.
4. Slurry viscosity—Stormer, F. L. Smidth Target Viscosimeters
5. Slurry pH
6. Solution analysis
7. Solution feed rate
8. Bbl. ground/hr.
9. Nodule size, gradation, and appearance
10. Nodule moisture content
11. Front and back end temperatures
12. Burn in bbl./hr.
13. Fuel consumed—lb./bbl.

Behavior of Treated Slurry The addition of the deflocculant to the raw-grinding units produced grinding benefits. Physical limitations of the mills have not allowed a significant increase in throughput in Type I slurry production; and the benefit has been restricted to a definite increase in fineness of grind. This change in particle size had an effect on slurry viscosity and on chemical requirements, particularly early in the trial. The new particle size distribution was an important factor; and it was such that a slight increase in viscosity resulted, which required somewhat more chemical than predicted. As the percent of solids in the mill increased, however, this effect became relatively minor.

This increased fineness of grind was of special importance in the production of high-early-strength clinker. Previously it had been necessary to increase grind fineness in the raw mills by decreasing the mill throughput when making high-early

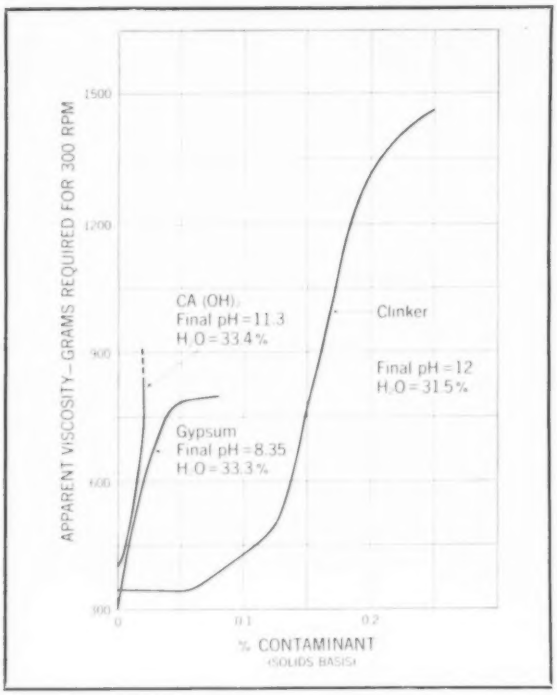


Fig. 6—Increase in slurry viscosity is noted when minor contaminants are introduced.

slurry. With the chemicals present, the necessary fineness has been achieved with no decrease in raw-mill production. In time it may be possible to prove increased milling capacity with all types of slurry, but at present this cannot be substantiated.

During normal operation the deflocculated high solids slurry handled well in all stages. The proper balance of chemicals to slurry water content has kept the slurry in an excellent pumping range. There are indications that it may be easier to control slurry viscosity with the deflocculant, despite the lower moisture content, than under previous conditions. Certainly, one effect of the trial has been closer control in handling the slurry owing to greater interest on the part of all plant and laboratory personnel.

Some initial difficulties occurred in the batching and feeding of the chemical solution. Lack of proper agitation in the batching tank resulted in considerable undissolved material remaining. This was corrected by instituting violent agitation of the solution by rapid recirculation and more air agitation. The resulting turbulence accomplished the solution of the chemicals in one-half hour or less.

Another problem arose in maintaining constant feed rates through the sight gauges. Originally the feed system was designed for constant pressure feeding from a recirculating line. Variations in pump pressure and plugging of the orifices by particles of scale and debris which fell into the solution storage tank required constant attention to sight gauges. This condition was overcome by converting to a gravity feed arrangement from overhead surge tanks, which also contain baffles and serve as sediment chambers.

No further serious problems have been encountered in solution feeding. The presence in the raw rock storage of small amounts of components of the finished product, namely clinker and gypsum, provided the worst difficulties. As little as 0.25 percent of either gypsum or clinker will raise slurry viscosity from a normal consistency to a difficult, if not impossible, pumping range.

Figure 6 shows the considerable increase in slurry viscosity when minor amounts of contaminants are introduced. As little as 0.005 percent gypsum (based on slurry solids) caused an increase of 100 grams required for 300 r.p.m. on the Stormer viscosimeter. The increase in viscosity shown in Fig. 6 is sufficient to cause serious problems in the process if remedial action is not taken. Rapid spot checks in the laboratory indicated that a 0.01 percent STP addition more than offset the presence of 0.02 percent gypsum. Thus, the effect of gypsum could be corrected by increasing the amount of deflocculant by a small amount.

Laboratory addition of $Ca(OH)_2$ to the treated slurry caused severe thickening at low levels and a marked rise in pH (see Fig. 6). An equal weight of STP was required to bring the viscosity back to normal. Since cement clinker produces some $Ca(OH)_2$ when slurried in water, this type of thickening would be expected if clinker were in the slurry. Trials in the laboratory indicated that considerable thickening is indeed observed when a fraction of 1.0 percent clinker is added to the slurry, and the pH rose in the same degree as when $Ca(OH)_2$ was added. The solution to thickening by clinker again turned out to be a small increase in the amount of deflocculant added.

The high viscosities encountered during periods when gypsum or clinker was discovered in the rock feed caused most of the difficulties encountered. Thus build-up in piping, difficulties in pumping and blending, several mud ring build-ups around the discharge end of kiln feed pipes with attendant back splashing into dust chambers — all were observed only after a period when excessively thick (high viscosity) slurry was being handled.

Increasing the solution rate of the deflocculant to the raw mills when pH shows a tendency to rise, indicating the presence of clinker, has kept difficulties with thick slurry to the minimum. In cases of tanks of very thick slurry, bags of phosphate were broken directly into the tanks with marked success. A preventive maintenance program designed to keep layers of thick slurry from forming in the transport system, plus an awareness of the problem's source, has kept these annoyances to the minimum.

Kilns Kiln behavior has been very satisfactory. As mentioned above, the only mud rings that have appeared have occurred during periods when high viscosity slurry was introduced, and then the ring appeared behind and under the exit point of the kiln feed pipes. No mud

Table II—Results of Trial

	Sept.-Feb. 1956-1957	Mar. 1957	Apr. 1957	May 1957	June 1957	Aug. 1957	Sept. 1957	Oct. 1957	Nov. 1957	Dec. 1957	Trial Avg.
Raw Mills											
Grind–bbl./hr. .	97.1	99.2	97.2	101.0	95.8	98.8	98.3	94.3	99.3	91.9	97.3
Kilns											
#1-4 (250 ft.)											
Burn–bbl./hr. . .	72.0	75.5	80.4	78.3	74.0	77.2	81.3	80.6	79.9	79.6	78.8
% increase . .		4.9	11.7	8.8	2.7	7.2	12.9	11.9	11.0	10.6	9.4
Fuel–lb./bbl. . .	99.1	95.0	94.5	94.2	97.3	95.7	90.1	90.9	88.5	85.8	92.0
% decrease . .		4.1	4.6	4.9	1.8	3.4	9.2	8.3	10.7	13.4	7.2
#5 (350 ft.)											
Burn–bbl./hr. .	80.5	83.5	84.9	89.4	82.6	86.6	88.8	88.6	84.9	81.7	86.6
% increase . .		3.7	5.5	11.1	2.6	7.6	10.3	10.1	5.5	1.5	7.6
Fuel–lb./bbl. . .	88.9	81.5	81.1	77.7	83.8	81.0	78.0	78.6	79.8	78.8	79.2
% decrease . .		8.3	8.8	12.6	5.7	8.9	12.3	11.6	10.2	11.4	10.9
All kilns #1-5											
Burn–bbl./hr. . .	73.6	77.0	81.3	80.8	75.7	79.1	82.9	82.5	80.7	80.1	80.4
% increase . .		4.6	10.5	9.8	2.9	7.5	12.6	12.1	9.7	8.8	9.2
Fuel–lb./bbl. . .	96.6	92.4	91.7	90.1	94.5	92.2	87.2	87.8	86.8	84.4	89.2
% decrease . .		4.3	5.1	6.7	2.2	4.6	9.7	9.1	10.1	12.6	7.7
Fuel savings/month		$5200	6500	8000	2400	5800	11500	11000	12600	15800	78800*
Chemical cost/ month		$4600	8600	8000	7300	8000	7400	8400	7100	9100	68500*
Fuel savings/bbl. .		$.0211	.0237	.0307	.0103	.0215	.0459	.0424	.0477	.0594	.0337
Chemical cost/bbl.		$.0187	.0314	.0307	.0313	.0296	.0295	.0324	.0269	.0342	.0293

*Total for trial.

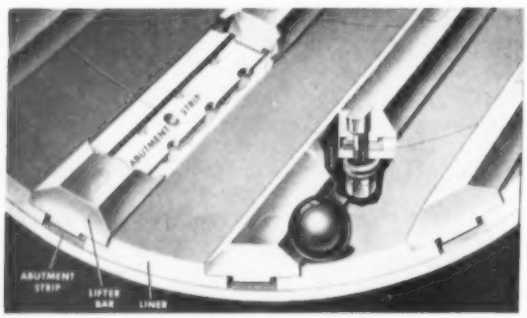
rings have developed in the chain sections; therefore there has been no need to alter the chains. The size of clinker discharged from the kilns has been constantly finer and more evenly sized than was the case without the chemical treatment. Alkali content has not risen to any degree. Benefits in clinker grinding because of finer sizing remain to be substantiated after a longer test period. In all other respects, kiln conditions have remained essentially the same as before.

Table II presents the data for the trial period compared on a monthly and overall basis with the September, 1956, to February, 1957, figures obtained without addition of chemicals. For each item there is an average figure for the entire trial period and also a set of figures for each individual month within the trial interval. The figures for March, 1957, are low since that was the start of the trial, and the full rate of chemical feed was not reached until the last week of the month. April and May show good results, but June and August fall off, June con-

Table III—Results vs. Predictions
Actual Moisture Reduction from 38% to 33.5%

	Predicted	Actual Range of Monthly Values	Actual Trial Ave.
Production increase	7.0%	2.9-12.6	9.2
Fuel savings/bbl.	$0.0223	0.0103-0.0594	0.0337
Chem. cost/bbl.	$0.0125	0.0187-0.0342	0.0293

NEW LIFE FOR ALL CEMENT MILLS



Kensington engineers have given operators of cement mills a new lease on life with the development of their complete ORO-LOK Lining to fit all standard cement or ore grinding mills.

By combining superior wear resistant materials and improved design, this revolutionary new lining successfully overcomes the most common causes of wear, breakage, and excessive maintenance.

Welded-on abutment strip (patented) reinforces shell at location of bolt holes. Bolts seldom loosen. Frequent maintenance is alleviated by the ORO-LOK design, because it eliminates shearing stresses that cause bolts to loosen and break off. Bolts are subject to tension only.

OROLOY Lifter Bars outlast others. OROLOY is a special, tough alloyed (12%) manganese steel. Not only does it have a higher initial hardness, but it actually fights back against wear by developing even greater surface hardness when subjected to impact. You can depend upon OROLOY Lifter Bars to last as long as the liner itself . . . and when necessary, they can be reversed easily without disturbing the other parts of the lining.

For further information on the savings that the ORO-LOK Lining will give your operation, return the coupon. You'll be under no obligation.

Kensington STEEL

KENSINGTON STEEL, DIVISION OF POOR & CO., CHICAGO
Dept. A, 505 E. Kensington Ave., Chicago 28, Ill.
☐ Please send more information on ORO-LOK Lining.
☐ Please quote prices.
Description of mill: Make_____
Model_____Present Liner Thickness_____
NAME_____
COMPANY_____
ADDRESS_____
CITY_____ZONE_____STATE_____

siderably. This drop in results is due to the difficulties previously discussed. Slurry during this time was being fed to the kilns with high water contents, reducing the solids throughout as well as increasing fuel consumption. Once through the "problem" period, the figures show excellent production increase and fuel savings. Note that even during the worst of the periods, some benefits were achieved.

Although the production increase in the longer kiln (#5) is slightly less than in the shorter kilns, higher savings in fuel are realized in the long kiln. Thus, benefits are found in kilns regardless of length, although the nature of the benefits may shift slightly toward fuel economy in the longer variety. It should be pointed out that #5 kiln was installed at the start of 1956, and interpretation of the performance for this kiln should be weighted by the fact that the figures may not be final.

As shown in Table III, the predictions made prior to the trial based on laboratory data compare reasonably well to the actual figures obtained during the trial. The actual moisture content of the slurry was not reduced to the lowest possible value; therefore it is probable that production could be increased even more than shown. Both fuel savings and chemical cost were higher than predicted. Some of the additional chemical cost was due to the extra chemical required during high viscosity periods. The latest data available (November and December) show excellent production improvement and also that fuel savings will more than offset the chemical costs (see Table II).

The results show a gain of about 9 percent in production, while fuel savings more than offset the chemical cost. These average figures are being raised as the trial proceeds. In terms of increased plant capacity without additional capital expenditure, the trial has demonstrated the worth of polyphosphate slurry thinning.

Certain aspects of the trial have required extra effort on the part of many of the plant and laboratory personnel. Initially, some psychological resistance in the form of skepticism of the new procedures was noted, but the men were soon able to note the benefits for themselves. One important factor in gaining acceptance for the idea from the men occurred during the siege of thick slurry. During this time the men added phosphate to the slurry at several points in the process and were able to see for themselves the strong thinning power of the chemical. Management at all levels was eager to prove the worth of slurry thinning, and the close and continued co-operation of all technical and plant personnel helped immeasurably and was vital to the success of the project.

Conclusions Based on the successful results obtained to date, recommendations for permanent facilities have been approved by management. The engineering on these facilities is in progress and it is expected that the changeover to a permanent basis will be completed in the near future.

Deflocculation of the Keystone slurry with sodium tripolyphosphate and sodium carbonate has increased plant capacity substantially, while the chemical costs have been offset by the fuel economies resulting from the treatment. While some problems turned up, none

HERE'S VISUAL PROOF . . .

Plibrico refractory linings are built for endurance

clinker cooler lining when installed

. . . and after almost 2 years service

See for yourself that despite nearly 2 years of service, this Plibrico lining hardly appears to have been in use. That's because it's a "zoned" lining, all one piece, and securely anchored. Plibrico's "zoned" lining efficiently and economically matches various refractory grades to conditions in each furnace zone. One-piece construction overcomes the needless maintenance caused by dust seepage . . . no joints for dust to penetrate. And efficient anchorage beats the vibration problem.

You can enjoy the advantages a Plibrico lining offers. See how by writing today for our catalog covering linings for calcining, drying, and processing furnaces.

Plibrico REFRACTORIES ENGINEERING CONSTRUCTION

PLIBRICO COMPANY • CHICAGO 14, ILL.
Plibrico Sales & Service in Principal Cities

Enter 143 on card, page 211

RINGBLASTER with Western® ammunition smashes kiln rings faster...

Smash kiln rings faster—hit more accurately—get far better firing results from *your* kiln gun with Western ammo! Western Super-X 8-gauge ammo develops a smashing force greater than any shell. And, ballistics tests proved this shell is 10% more effective when used in the new RINGBLASTER kiln gun.

Super-X 8-gauge ammunition is made of a special alloy that assures deeper "keyway" penetration . . . faster kiln ring disintegration. Fewer shells are needed, and down time is cut to a *new* low.

Additionally, the RINGBLASTER, with its effective sound reducer, gives operators a measure of sound safety never before possible.

"Terrific improvement!" . . . "Impressed with its quieter operation!" . . . "Should have been done before!" . . . these are typical of the many favorable comments made by new users of this improved kiln gun.

RINGBLASTER is the *only* kiln gun to come factory-equipped with a sound reducer. Write for catalog.

ATTENTION: SAFETY DIRECTORS AND MAINTENANCE ENGINEERS!

Ramset ® also manufactures powder-actuated fastening tools for anchoring to steel and concrete. Just introduced—FLITE-CHEK: a tool which prevents overpenetration or fastener escape. Write for full details.

RINGBLASTER Kiln Gun

FOR SHELLS, SERVICE OR EQUIPMENT CONTACT:
Ramset Fastening System
CLEVELAND 11, OHIO
Made by WINCHESTER-WESTERN DIVISION OLIN MATHIESON CHEMICAL CORPORATION EAST ALTON, ILLINOIS

12175-G Berea Road • Cleveland 11, Ohio

Enter 144 on card, page 211

has proved to be insurmountable. The decision to continue the procedure on a permanent basis indicates the successful nature of the trial.

(NOTE: Nothing contained herein shall be construed as a recommendation to use any product or practice any process in conflict with any existing patent.—The authors.)

Permanente Co. Adds Mill To Increase Production

Permanente Cement Company, Oakland, Calif., is completing construction on a 1,250-hp. $500,000 tube mill which has been added to the present grinding equipment.

The new mill will result in a considerable increase in cement grinding during the peak construction period in the summer months. In addition it will produce special cements used in the construction of highways and dams and in the manufacture of various precast and prestressed concrete products.

Another advantage accruing from the new tube mill will be increased clinker storage, making additional costly storage silos unnecessary.

With an annual capacity of 8,500,000 bbl. of cement, Permanente is reportedly the largest cement producing plant in the West.

At Djkarta 18 American cement mill workers are teaching Indonesians to operate a new $14,000,000 cement plant built there by Indonesians. They expect to have the workmen running the 250,000-ton capacity plant within a year.

The General Portland Cement Company will increase its total productive capacity to 18,800,000 bbl. annually when its new 2,500,000 bbl. plant in Dade County, Fla. begins making shipments. Other General Portland plants are at Tampa, Fla.; Chattanooga, Tenn.; and Fort Worth, Houston, and Dallas, Tex.

Lafarge Cement of North America Ltd. has opened a new $16,000,000 plant on Lulu Island, B. C. The plant has an initial annual capacity of 1,500,000 bbl. of cement. Presiding at the opening ceremonies was Marcel Demonque, Lafarge's managing director.

Now . . . a New High in Dust Filter Efficiency . . .

New SLY "ROLL-CLEAN" Dynaclone

Patent No. 2583039
Patent No. 2695681
Other Patents Pending

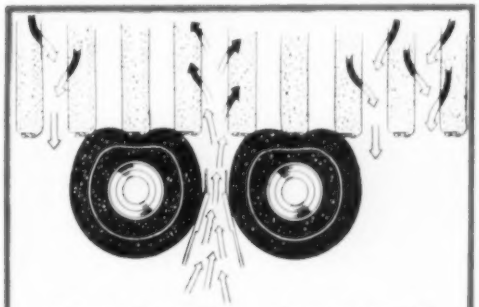
THESE NEW FIELD-PROVEN FEATURES

- Easier filter bag changing.
- Greater cloth area.
- Fewer operating parts.
- Free-rolling cleaner — no sliding.
- Complete dust seal — automatic seal adjustment.
- Easy access to all dust filter parts for inspection and servicing.

PLUS THESE TIME-TESTED DYNACLONE ADVANTAGES

- Constant suction at dust sources — complete dust collection.
- Self-cleaning for continuous operation.
- No auxiliary motors or blowers required for filter-bag cleaning.
- Greater filtering capacity and smaller space requirements — more cloth per cubic foot of filter than any other make.
- Lower power requirements.

The original self-cleaning dust filter, the Dynaclone has proven itself the most efficient dust filter ever made. The "Roll-Clean" Dynaclone combines design simplicity and rugged construction to insure even greater operating efficiency . . . even longer trouble-free service.

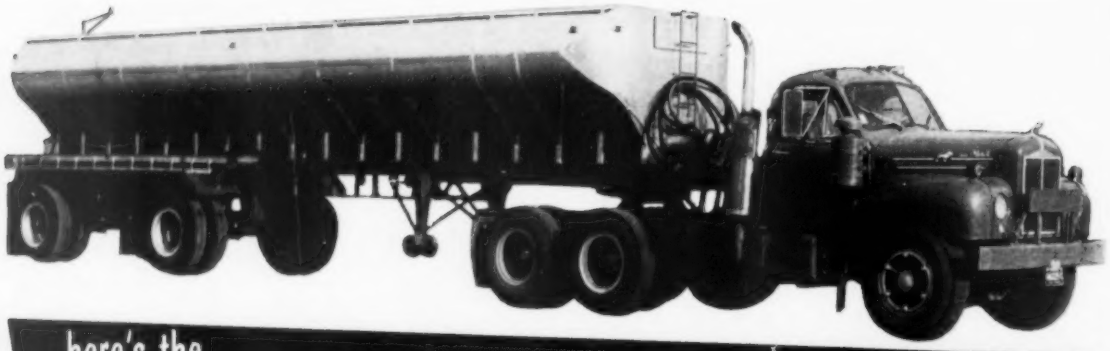


NEW "ROLLER CLEANER" provides greatly simplified method of cleaning dust from filter bags. Resilient rubber rolls automatically adjust to form a positive dust seal as each row of bags is cleaned by atmospheric air.

NEW CATALOG
36-page Bulletin 104 gives full details about "Roll-Clean" Dynaclone and other Sly Filters . . . contains valuable engineering information. Write for copy.

SINCE 1870 SLY

THE W. W. SLY MANUFACTURING CO.
4745 TRAIN AVENUE • CLEVELAND 1, OHIO
OFFICES IN PRINCIPAL CITIES



here's the
9300 LB. TRANSPORT BODY
. . . that hauls THOUSANDS of EXTRA PAYLOAD POUNDS

Compare other transport bodies with Baughman's famous 9300 lb. 36 ft. aluminum Model SST-11, a complete semi-trailer unit ready to roll. Lighter weight Baughman transport body means you can haul more payload on every over-the-road run. Automatic self-unloading Model SST-11 is also available in steel, weighing just 11,129 lbs. and capable of carrying 720 cu. ft. Added capacities available. Baughman welcomes the opportunity of working with you to plan the type of body you need.

For . . .

- **CEMENT**
- **SALT**
- **OTHER FREE FLOWING MATERIALS**

WRITE TODAY for illustrated Bulletin A-415.

BETTER SERVICE THROUGH BETTER ENGINEERING.
SERVICE AND PARTS FROM 200 SERVICE BRANCHES.

BAUGHMAN

BAUGHMAN MANUFACTURING CO.

126 ARCH STREET • JERSEYVILLE, ILL.

Enter 146-A on card, page 211

The Answer is Ni Hard
FOR ABRASION RESISTANCE

"Treadwell" Ni Hard Liners are in successful use in wet and dry grinding operations in many cement plants. There are numerous other applications for this material where severe wear problems exist.

Other Treadwell Products

ELECTRIC FURNACE STEEL CASTINGS • DUCTILE IRON CASTINGS
CARBON & LOW ALLOY • ALL GRADES

Complete Pattern and Machining Facilities
All types of Non-Destructive Test Equipment

TREADWELL ENGINEERING COMPANY
EASTON, PENNSYLVANIA

Enter 146-B on card, page 211

SMIDTH

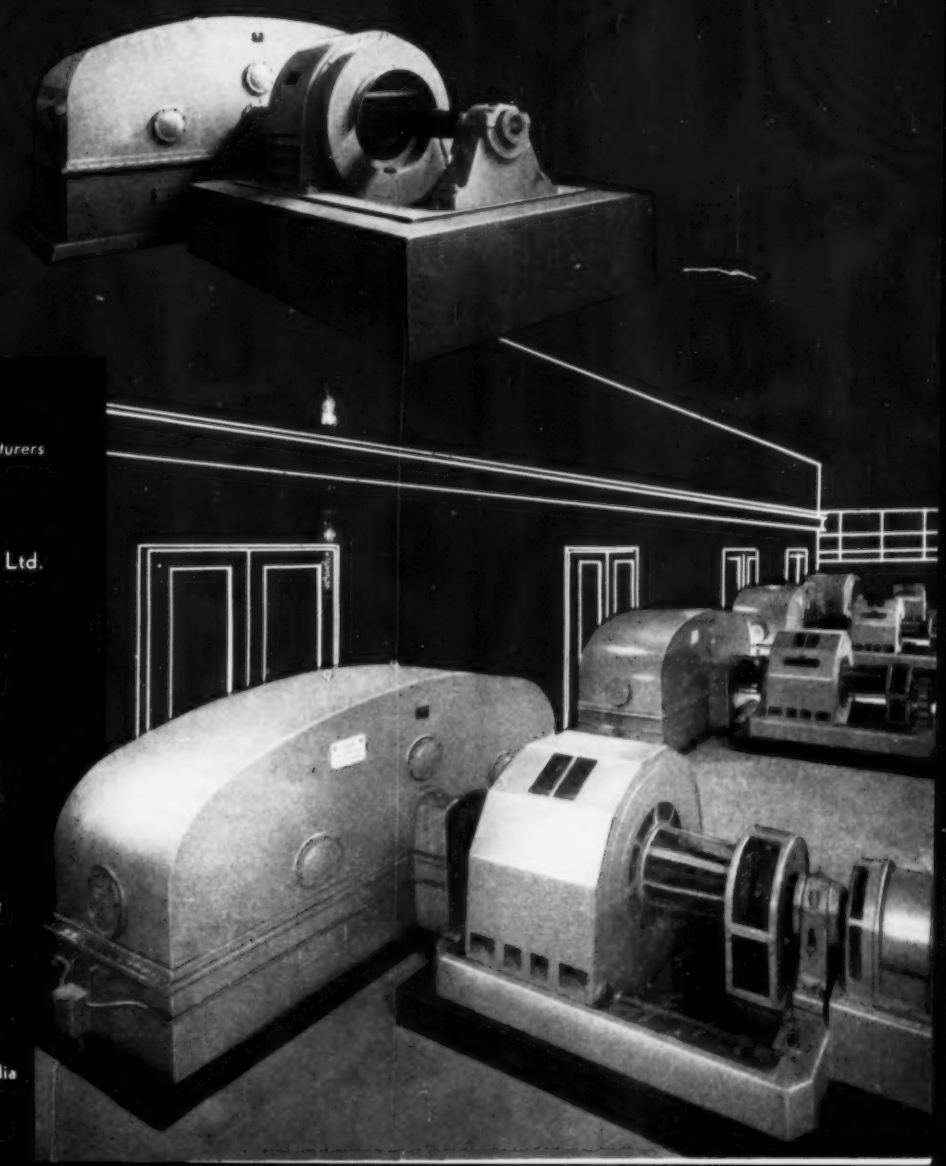
symetro drives

Years of continuous, reliable performance at highest efficiency and negligible maintenance.

Gears are precision cut, dip lubricated, no oil pumps or coolers required.

Symetro Drives and motors often installed in a separate room eliminating dust and noise.

For SMIDTH Grinding Mills



F. L. Smidth & Co.
Engineers and Machinery Manufacturers
11 West 42nd Street
New York 36, N. Y.

F. L. Smidth & Co. of Canada, Ltd.
11 West 42nd Street
New York 36, N. Y.

F. L. Smidth & Co., A/S
77 Vigerslev Alle
Copenhagen, Denmark

F. L. Smidth & Co., Ltd.,
105, Piccadilly,
London, W. 1, England

F. L. Smidth & Cie France
80 Rue Taitbout
Paris (9e) France

F. L. Smidth & Co.
(Bombay) Private Ltd.
42 Queen's Road , Bombay, India

NI-HARD mill liners

Original liner 3 1/4" minimum thickness. Worn to 1/4" before replacement. No breaking. No cracking. Outlasted unalloyed white iron 2.15 to 1 and manganese steel 1.46 to 1

CURRENT SOURCES OF SUPPLY FOR

ALABAMA
Thomas Foundries, Inc.
P.O. Box 1111, Birmingham, 2

ARIZONA
National Malleable and Steel Castings Co., Capitol Foundry Division, Phoenix

ARKANSAS
Arkansas Foundry Co.
1501 E. Sixth St., Little Rock

CALIFORNIA
Pacific Ball Mfg. Co.
P.O. Box 106, South Gate

Pacific Foundry Co., Ltd.
3100 19th St., San Francisco

COLORADO
Western Foundries
2000 E. 40th Ave., Denver 5

GEORGIA
Georgia Iron Works Co.
605 12th St., Augusta

IDAHO
Coeur d'Alene Hardware & Foundry Co., 612-616 Bank St.
Box 969, Wallace

ILLINOIS
American Brake Shoe Co.
Engineered Castings Div., 155 No. Wacker Drive, Chicago 6
(Plant: Melrose Park, Ill.)

Frank Foundries Corp.
2020 3rd Ave., Moline

IOWA
Eagle Iron Works
129 Holcomb Ave., Des Moines

MICHIGAN
Calumet and Hecla Inc.
Calumet Division, Calumet

Stearns Mfg. Co., Inc.
Adrian

MINNESOTA
Brom Machine & Foundry Co.
3565 W. 6th St., Winona

Staver Foundry Co.
Box 74, Virginia

MISSOURI
Carondelet Foundry Co.
2101 S. Kingshighway Blvd.
St. Louis 10

MONTANA
Caird Engineering Works
P.O. Box 837, Helena

NEW JERSEY
American Abrasive Metals Co.
460 Coit St., Irvington 11

NEW YORK
American Brake Shoe Co.
Engineered Castings Div.
530 Fifth Ave., New York 36

Plattsburg Foundry & Machine Co.
18 White St., Plattsburg

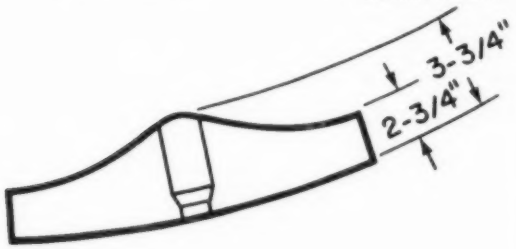
OHIO
The Babcock & Wilcox Co.
161 E. 42nd St., New York 17
(Plant: Barberton, Ohio)

...good to the last ¼"

TYPICAL NI-HARD MILL LINER DESIGN

When Ni-Hard* nickel-chromium white cast iron mill liner segments are designed in accordance with the recommended practice for the material . . . avoiding sharp corners, thin protruding sections, over-hanging and unsupported lips... Ni-Hard liners last a good long time before replacement is necessary.

*Registered Trademark



MILL LINER MINIMUM THICKNESSES

If you are unacquainted with Ni-Hard mill liner segments, the table below will give you a rough guide to the minimum thicknesses for an initial installation. Thinner liners than these can and are being used based on individual experience, but the thicknesses contained in the chart are suggested as a starting point for the mill man who is thinking about using Ni-Hard liners for the first time.

MINIMUM MILL LINER THICKNESS

MILL DIAMETER	SIZE OF GRINDING BALLS OR RODS			
	1″	2″	3″	4″
6	1.5″	2.0″	2.5″	3.0″
8	1.75	2.25	2.75	3.25
10	2.0	2.5	3.0	3.5

INCO **THE INTERNATIONAL NICKEL COMPANY, INC.** 67 Wall Street, New York 5, N. Y.

NI-HARD MILL LINER SEGMENTS

Stark Foundry Co.
P.O. Box 147, Station A
Canton 5

Unitcast Corporation
Box 8, Station "E", Toledo 9

PENNSYLVANIA

Hardinge Manufacturing Co.
240 Arch Street, York

New Castle Foundry Co.
Mahoning Ave. & Hobart St.
New Castle

The Pennebacker Co., Inc.
P.O. Box 126, Emmaus

Sprout, Waldron & Co., Inc.
Sherman St., Muncy

Treadwell Engineering Co.
25th & Lenox Streets, Easton

Weatherly Fdry. & Mfg. Co.
Commerce St., Weatherly

TENNESSEE

Keller Foundry Co.
1010 E. Jackson Ave.
Knoxville

Kingsport Foundry & Mfg. Corp., E. Sullivan & Main Sts.
Box 709, Kingsport

Ross-Meehan Foundries
1601 Carter St., Chattanooga 1

TEXAS

Darbyshire Steel Co., Inc.
P.O. Box 352, El Paso

UTAH

Lundin & May Foundry Co.
454 West 5th North
Salt Lake City 10

WASHINGTON

Union Iron Works
Box 2135, Spokane 10

WEST VIRGINIA

Helmick Foundry-Machine Co.
8th St. & Belt Line, Fairmont

WISCONSIN

Nordberg Manufacturing Co.
3073 So. Chase Ave.
Milwaukee 7

CANADA

ALBERTA

Foothills Steel Foundry and Iron Works, Ltd.
1439—17th Ave. E., Calgary

Lethbridge Iron Works Co., Ltd.
120th Ave—107th Street
Edmonton

BRITISH COLUMBIA

Letson & Burpee, Ltd.
172 Alexander St., Vancouver

MANITOBA

The Manitoba Bridge & Engineering Works, Ltd.
845 Logan Ave., Winnipeg

Manitoba Foundries and Steel, Ltd., Selkirk

NOVA SCOTIA

Hillis and Sons Ltd.
160 Kempt Road, Halifax

ONTARIO

The Cobalt Foundry, Ltd.
Cobalt

The William Kennedy & Sons, Ltd., Owen Sound

Special Products Division
Canada Iron Foundries, Ltd.
Stuart & Caroline St., Hamilton

The Wabi Iron Works, Ltd.
P.O. Box 20, New Liskeard

QUEBEC

Canada Iron Foundries Ltd.
921 Sunlife Bldg., Montreal

The Robert Mitchell Co., Ltd.
64 Decarie Blvd.
St. Laurent, Montreal

Peacock Bros., Ltd.
260 St. Patrick St.
Ville LaSalle, Montreal

Quebec Iron Foundries Ltd.
P.O. Box 369, Mont Joli

NI-HARD

NICKEL MAKES CASTINGS PERFORM BETTER LONGER

MACDONALD

BULK LOADING SILOS TO TRUCKS AND CARS

designed and constructed in 6 months at lowest cost to meet winter storage capacity and spring shipping requirements

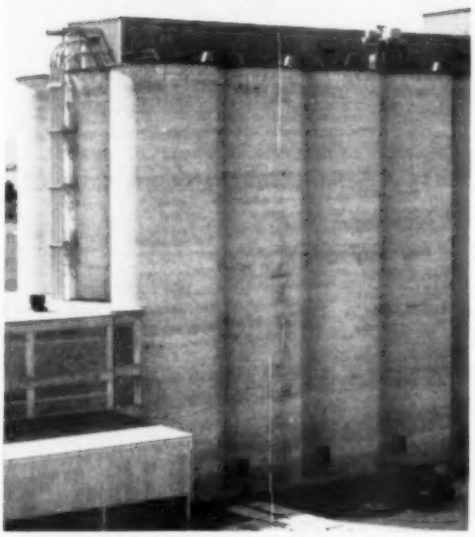
BESSEMER LIMESTONE & CEMENT CO.
Bessemer, Pa.

LONGHORN PORTLAND CEMENT CO.
San Antonio, Tex.

MACDONALD
ENGINEERING CO.
Constructing Engineers

▼DESIGN▼LAYOUT▼CONSTRUCTION

PONCE CEMENT CORP.
Fort Lauderdale, Fla.



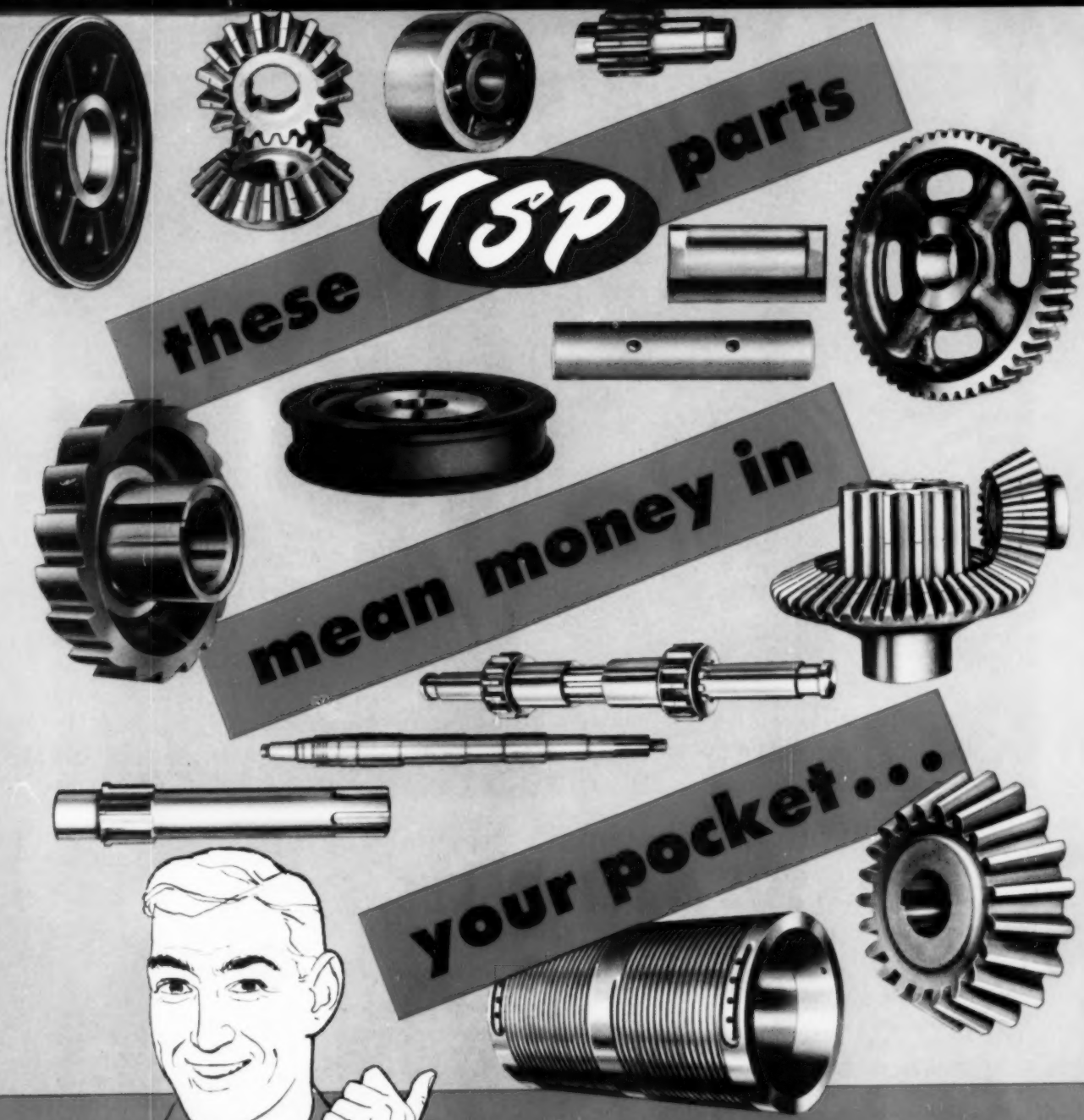
ALPHA PORTLAND CEMENT CO.
Lime Kiln, Maryland

Complete Engineering Service Since 1894

CHICAGO
22 W. Madison St.

SAN FRANCISCO
885 Bryant Street

TORONTO, CANADA
2349 Yonge St.



Specify "Tool Steel Process" parts today!

You receive an absolutely positive written GUARANTEE that TSP products will give a longer life in the same service than any other product.

FREE!

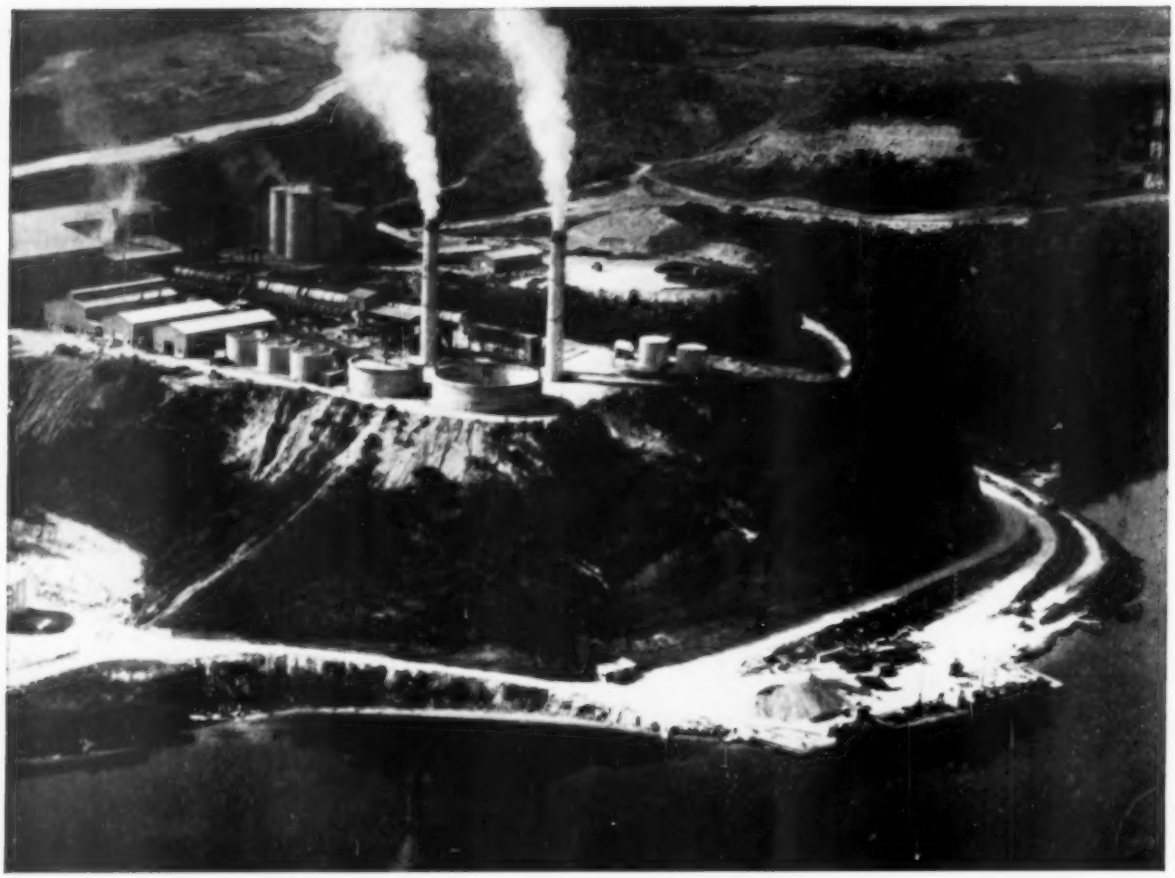
Bulletin No. 452
TSP Products for the
Cement Industry

...because they last many years longer than any product purchased for the same service! Elimination of downtime, replacement parts, etc., gives you the tremendous dollar savings now enjoyed by hundreds of Companies in the Cement Industry.

Here's why: "Tool Steel Process" parts are made of low carbon alloy steel. File hard wearing surfaces are backed by a tough ductile core, resulting in super resistance to wear and fatigue.

THE TOOL STEEL GEAR AND PINION CO.
CINCINNATI 16, OHIO, U. S. A.

Ad No. 1002



Dorr-Oliver international facilities equip

CEMENTOS NACIONALES, S.A.

plant in Cuba

One example of the growing industrial development of Cuba is the modern plant of Cementos Nacionales, S.A., shown in the photograph above. Cement produced here not only supplies the demands of extensive construction in Cuba, but also is shipped to Miami, Florida.

In equipping this plant, Cementos Nacionales, S.A. benefited by the world-wide engineering and manufacturing facilities offered by the Dorr-Oliver organization. Six slurry agitators, each 30-ft. in diameter and one storage agitator, 60-ft. in diameter, were supplied by Dorr-Oliver GmbH in Germany. An additional 100-ft. dia. Dorrco Slurry Mixer was manufactured and shipped from the Dorr-Oliver factories in U.S.A.

Dorr-Oliver products include equipment for cement mills, chemical processing, water and sewage treatment, sugar refining, pulp and paper making, ore processing and many other industries. Manufacturing facilities of Dorr-Oliver and its Associated Companies are established in U.S.A., Canada, Argentina, Australia, Brazil, England, France, Germany, India, the Netherlands, Belgium, Italy, the Philippines and South Africa. Wherever you build, the Dorr-Oliver world-wide research, engineering and manufacturing facilities are conveniently available. Dorr-Oliver Inc., Stamford, Conn.

Dorrco—T.M. Reg. U. S. Pat. Off.

DORR-OLIVER

INCORPORATED

WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT

STAMFORD • CONNECTICUT • U.S.A.

Lone Star

(*From page* 130)

clinker would bounce into the "fines cone" of the separators.

Some further cooling of the cement is done in the 16-ft. Sturtevant separators by air induced by Norblo fans. When Type I cement is being produced, the separator is equipped with 13-ft. dia. main top blades and 15 auxiliary lower blades. For Type III cement 12½-ft. dia. main blades and 45 auxiliary blades are used. Changes are also made in the valves. The hot air from each separator goes to a 35-ft. long, 16,000 c.f.m. Norblo bag filter.

Coarse tailings from each of the five separators go to an 11-ft. by 16-ft. 10-in. F. L. Smidth ball mill, similar to the raw mills. These also have U. S. Steel Lorain liners, and Coates Carbex steel grinding balls are used. The load consists of:

45,700 lb. of 1 in. balls
31,800 lb. of 1½ in. balls
26,000 lb. of 2 in. balls
18,600 lb. of 2½ in. balls
14,000 lb. of 3 in. balls
9,300 lb. of 3½ in. balls

Each mill is driven at the rate of 18.3 r.p.m. by a 1,000-hp. G-E synchronous motor. Type I cement is ground to a fineness of 3,300 sq. cm./gm. Blaine and 92.5 percent passing 325-mesh at the rate of 115 to 135 bbl. per hr. Type III cement is ground at the rate of 75 bbl. per hr. to a fineness of 5,00 sq. cm./gm. Blaine. Mill motor input is 850 kw.

Cement Storage The finished cement is fed from the mills and separators to 20-in. dia. collecting screws. A 10-in. Fuller-Kinyon pumping system feeds to the two sets of storage silos, both of which store Types I, II, and III and masonry cement. One installation consists of three rows of five 25-ft. dia. by 80-ft. silos. The other has two rows of seven silos of the same size. Total storage capacity, including interstices, is 325,800 bbl. All packing is done in one building with five St. Regis 4-tube packers.

QUARRYING AND CRUSHING

Quarry There is nothing unusual about the quarry, which is now 245 ft. in depth. A 170 ft. high face and another 75 ft. high are being worked simultaneously so as to get a rough blend of high- and low-lime rock. Conventional drilling and blasting methods are used. Loading of the rock is done by two 37B Marion electric shovels with 1¾-cu. yd. dippers and two new 1055E P & H shove's. Five 6-ton Koehring Dumptors and two 22-ton trucks carry the stone an average of about 500 ft. to the crushing plant, which has a capacity of 800 t.p.h. crushing to ¾-in. minus. It provides enough stone in 7 to 8 hours' operation to supply the needs of the cement plant.

Crushing Department The trucks dump from either side into the 42-in. Allis-Chalmers Superior McCully gyratary primary crusher. This unit has Hydroset and at present is set at about 6 in. maximum opening. It is driven through V-belts by a 250-hp. General Electric motor. A movable steel catwalk makes it possible for the operator to walk out over the crusher for a better view in case of a jam, and the controls for the stone hook, etc., hang from the crane. The crusher spider arms are protected by a cast-iron cover.

The minus 8-in. rock from the crusher is discharged on a 42-in. by 17-ft. buffer belt conveyor (No. 1) with shock absorbing idlers. This discharges on 42-in. by 174-ft. conveyor No. 2, which inclines to a transfer house; 42-in. by 133-ft. conveyor. No. 3 goes to the top of the crusher building, where it discharges into the 50-ton secondary crusher feed bin.

Stone is drawn from this bin by two pan feeders from which it drops into two Pennsylvania CB 1550 reversible Impactors driven by 500-hp. motors. Their product is discharged on a pair of 6- by 10-ft. Nordberg Symons screens with single rod decks having ¾-in. spacing. The oversize goes to conveyor No. 2 for return to the Impactors. The minus ¾-in. throughs are carried on a 30-in. by 708-ft. enclosed conveyor (No. 4) up out of the quarry to the cement plant. This conveyor is driven at the rate of 550 f.p.m. by a 250-hp. motor. This building is served by a Sly Dynaclone dust collector.

A series of three 36-in. belt conveyors, No. 5, No. 6, and No. 7, take the stone to the stone storage building. This in an enlargement of an older sructure and is 75 ft. wide and 210 ft. long. It will store 26,-300 tons of rock, 500 tons of sand, and 600 tons of iron ore. All rehandling is done by a P&H 7½-ton overhead traveling crane with a 3-cu. yd. clamshell bucket.

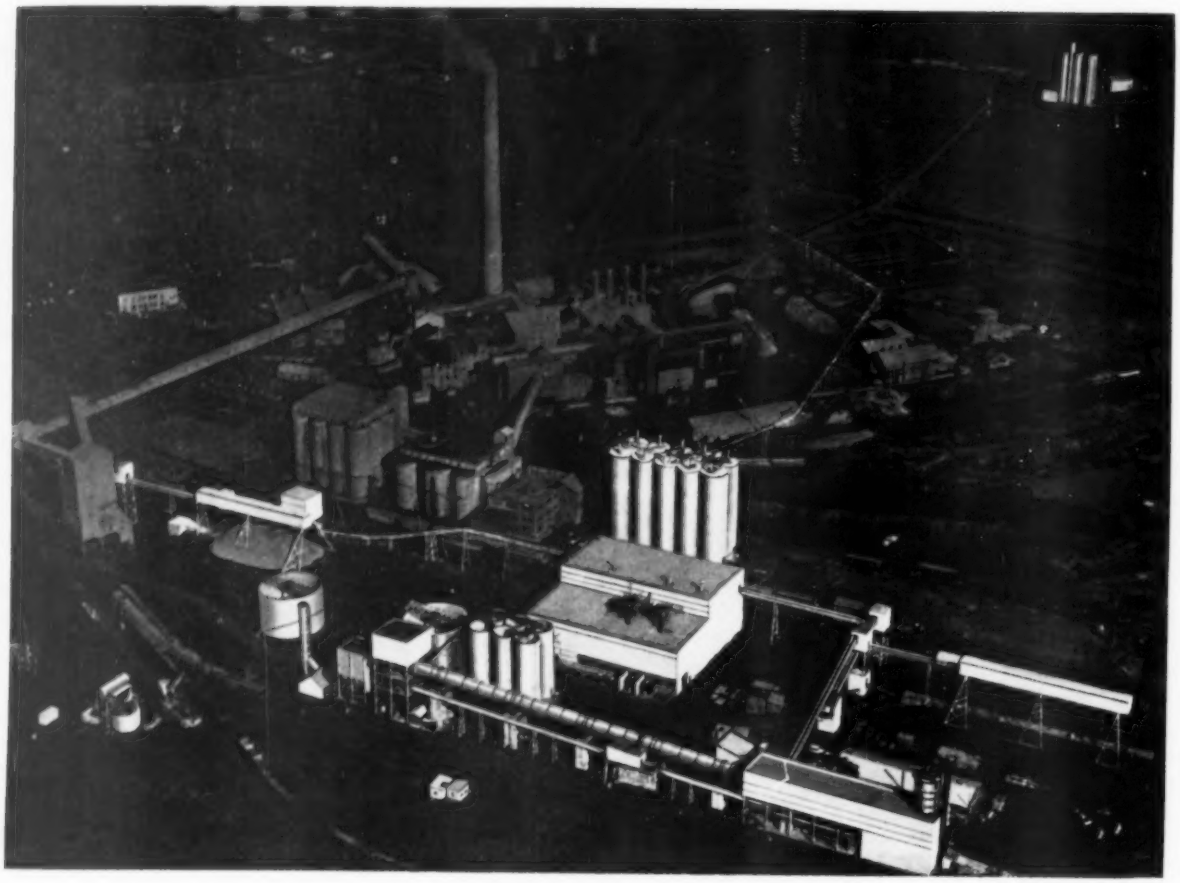
Other Concrete in its latest forms was used wherever possible in the new construction, including prestressed beams, girders, and columns and precast wall and roof panels. An example is the 75- by 272-ft. mill building. This is a concrete frame structure with 19 75-ft. long precast prestressed roof girders and precast roof panels. All work area is clear throughout the plant for maintenance and inspection.

The machinery layouts, general planning, and all electrical designs for the Nazareth plant were handled by the Lone Star engineering department, of which R. A. Rasmussen is chief engineer. The E. C. Machin Company was general contractor for the entire construction program and designed the clinker silos and homogenizing tanks. The detailed concrete designs of the raw and finish mill structure and precast girders was done by Roberts and Schaefer Company. The prestressed precast girders and panels were furnished by the Formigli Corporation and erected by J. D. Fegely.

Electrical work was done by the Howard P. Foley Company on a separate contract. The concrete and steel design details of the kiln, the precipitator, and miscellaneous buildings were handled by Kelgia, Inc.

The staff at the Nazareth plant is headed by Luther Miller, superintendent. Olaf Kayser is assistant superintendent and also had charge of construction. T. K. O'Sullivan is chief chemist, C. L. Lloyd is plant engineer, and F. P. Embree is engineer. S. S. Fritts is general superintendent for Pennsylvania and Virginia plants.

HARRIS FEGELY, vice-president in charge of operations at Monarch Cement Company, Humboldt, Kans., died recently at the age of 45, after a heart attack.



New Cape Girardeau Mill—

Clay is brought to the wash mill of the new plant from a pit about 2 miles away.

ANOTHER ON THE SPOT REPORT

SINCE 1946 Marquette's record of expansion includes five additional cement production operations that firmly establish the company in the front ranks of the cement industry. The most recent of these new mills—which brings the firm's total producing plants to ten—is the one-kiln wet-process unit built at Cape Girardeau, Mo.

Joining the older 4-kiln dry-process plant on the same property, the new mill has a 1,250,000-bbl.

Opposite page: The new Cape Girardeau wet-process plant (light) displays its quadrangle layout in this aerial view. The older operation is just beyond, and at the upper right is the barge-loading dock, connected with the plant site by a 2,700-ft. pneumatic conveying line.

HIGHLIGHTS

- **Capacity raised 70 percent by addition of new 1,250,000-bbl. wet-process plant**
- **designed for ease of expansion in kiln, mill departments**
- **erected completely separate from older operation**
- **laid out in quadrangle form**

Minus 2-in. raw stone is placed on a stockpile from the stockpiling bridge, left. It is put through secondary reduction in the crusher house, center, and delivered to mill feed tanks on the conveyor, right.

By BUREN C. HEROD

No. 10 in Marquette Chain

capacity, a figure that raises the total production at Cape to 3,000,000 bbl., or an increase of about 70 percent.

The original Cape operation, acquired by Marquette in 1923, was a 2-kiln plant. Two more kilns were subsequently added—the latest in 1953—resulting in a total daily capacity of about 5,000 bbl. However, in planning for the recent project, the company management did not consider it feasible to undertake the extensive revisions to the existing facilities that would be required in adding he new operation. Therefore the latter plant, although on the same property, is completely separate from the older operation, and the only phase common to both is the raw material supply and packing and loading.

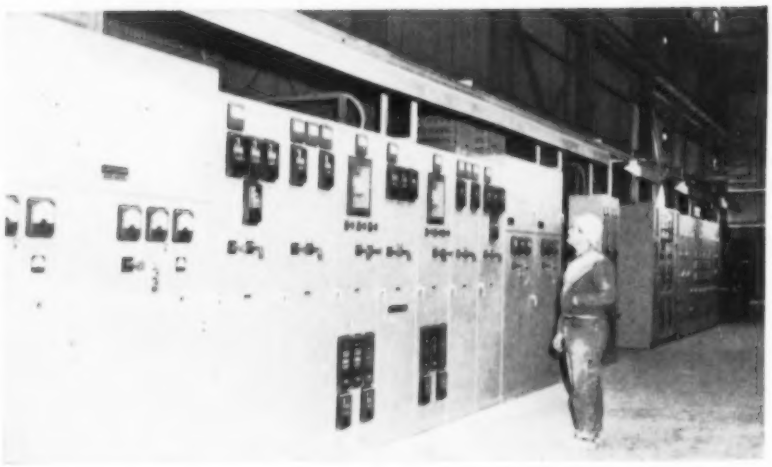
The new mill layout comprehends ready expansion of both the kiln and mill departments. Existing facilities for stone and clinker handling already have capacities to move greater quantities of material required by such expansion.

Contracts for construction of the plant were let in late 1955, and the project was under way in February, 1956. The kiln was put on the line in February, 1957. Various components in the efficient layout are placed so as to give the over-all operation the form of a quadrangle. Occupying two sides are the mill and kiln departments; the other two are taken by raw-stone and clinker-handling installations.

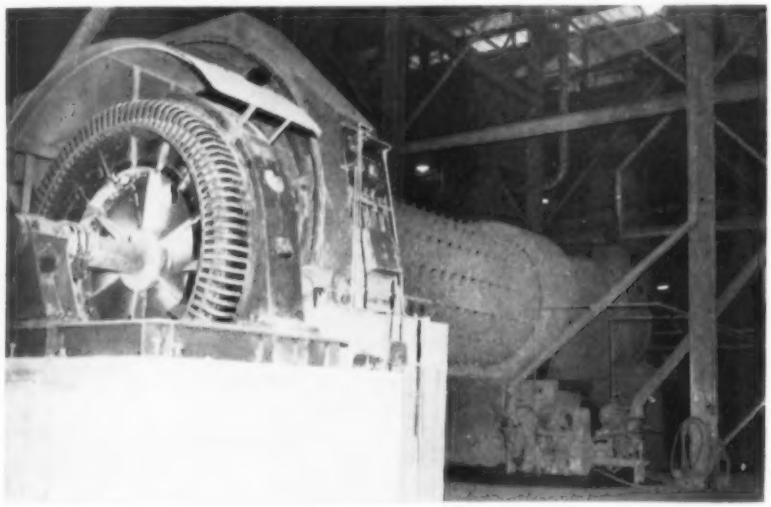
Among the major items of equipment in the operation are the 12- by 450-ft. Allis-Chalmers kiln and four A-C ball mills. Fuller-Kinyon pumps and compressors are used in the extensive cement transport system, which includes a 2,700-ft. line from the new mill to a storage and barge loading point on the Mississippi River. Link-Belt conveyors and elevators are used for all other dry material transport in the flow.

The various slurry tanks and storage silos, built by Macdonald Engineering Co., include a clay slip tank, slurry storage and blending tanks, and cement silos. Concrete conical bottoms were poured for the slurry tanks; and with the cones above ground elevation, these units are self-emptying. The cement silos are fitted with steel cones.

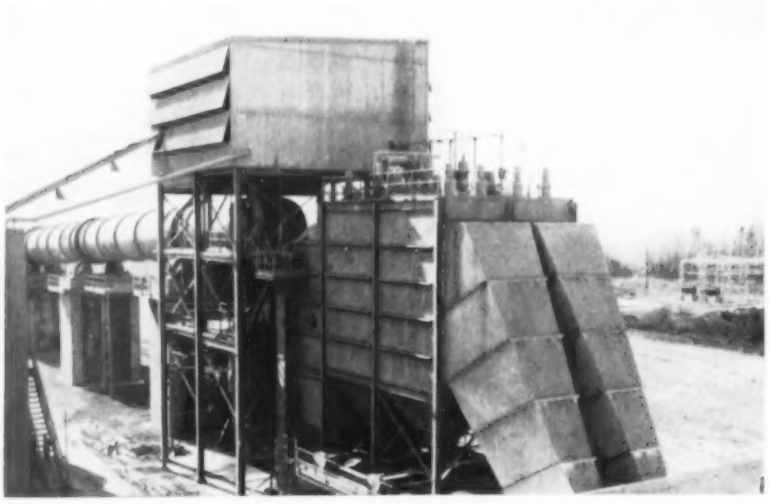
Both stone and clay are provided for the Cape operations from adjoining or properties nearby. Approximate analyses of these materials as received are as follows:



The power distribution center in the mill building servicing all four milling circuits.



One of the 8- by 37-ft. two-compartment raw mills driven by 900-hp. synchronous motors.



Kiln exhaust is passed through this combination mechanical-electrical precipitator before entering the 7- by 70-ft. stack (not shown).

	Stone	Clay
SiO_2	2.48%	50-60%
Fe_2O_3	.44%	4- 6%
Al_2O_3	.86%	15-20%
$CaCO_3$	90.99%	5-10%
MgCO	3.51%	

With the exception of stone, all raw materials are delivered to the new and older plants by rail. Stone is obtained from an adjoining quarry operation where it is put through primary reduction and screening, after which minus 2-in. stone is placed on a belt conveyor for transport to a transfer station.

At this point, the stone is fed to separate conveyors—one leading to the older plant, and the other to the new operation. The latter conveyor, a 24-in. by 235-ft. unit, delivers stone to a traveling tripper in a stockpiling bridge. All belt conveyors, equipped with Goodyear belting, are standardized at 24 in.

A reclaiming tunnel below the 10,000-ton raw stone stockpile houses a 174-ft. conveyor supplied by five 18-in. Link-Belt apron feeders. This belt, in turn, transfers stone to a shorter unit on which the material is delivered to a pair of Allis-Chalmers 436 Pulverators. These units are housed in a structure adjoining the stockpiling bridge and raw stone storage pile.

Each accomplishes secondary reduction to a top size of 5/8-in. at a rate of 60 t.p.h., and discharges to the 524-ft. mill feed belt. The latter belt is also fed from a track hopper where diaspore and iron oxide are received. At the top of the mill building each of the various materials is delivered to a traveling tripper from which it is discharged into the respective one of six raw mill feed tanks. There are two each for stone, pyrites, and diaspore.

Clay from a pit about 2 miles away is loaded into railroad gondolas for transport to the plant, where it is unloaded by a Link-Belt clamshell crane and fed to a 26-ft. diameter Allis-Chalmers clay wash mill. Slip processed in the 25-ton capacity mill is transferred to a storage tank through a 6-in. line by a 4-in. Morris pump. The pumping rate is 98 t.p.h. at 33 percent solids.

A 5-day storage (3,450 tons) is provided by the 60-ft. diameter,

40-ft. high prestressed concrete tank from which slip is delivered to the mill building by another 4-in. pump. Here it is discharged into a weir box, and the flow is divided to the clay slip feeder for each raw mill. The material is fed to the mills at the rate of 14 t.p.h., and feeder overflow is returned to the slip tank *via* a 4-in. pump.

A 24-in Merrick Feedoweight below each dry raw material storage tank delivers stone, pyrites, and diaspore to the respective mill feed belt in the parallel raw milling lines. Both the raw and finish-milling circuits, with two mills in each, are housed in a structure that was designed to facilitate expansion of milling capacity. This can be accomplished by extending either or both ends of the building.

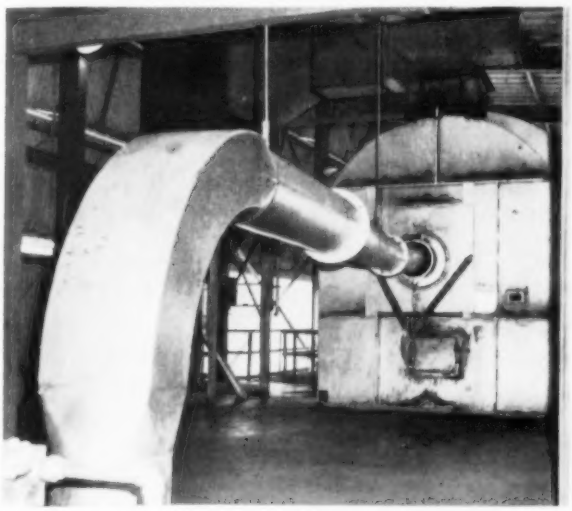
The two raw mills, 8- by 37-ft. two-compartment units, are driven at 18.7 r.p.m. by 900-hp. synchronous motors. Each of the first compartments is charged with 54,000 lb. of 1- to 1½-in. Moly-Cop balls. A Farval pressure lubrication system is provided on each mill.

Discharge from the first compartments is transferred by a 4-in. Morris pump to a pair of single-deck Allis-Chalmers Electro-Vibrating screens. Separation is made on a 5/64- by 5/16-in. mesh, and the retained fraction is sent back to the first compartments of the respective mills. Throughs are delivered to the second compartments.

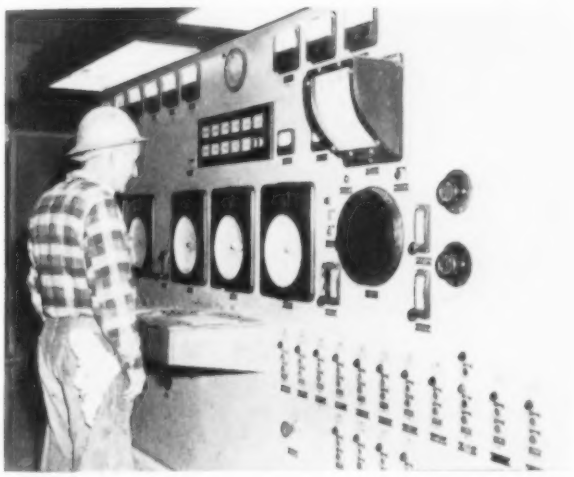
Mill discharge, at 60 percent solids and about 82 percent through 200-mesh, is pumped through 6-in. lines to the group of six slurry blending tanks. Each of the latter is 25 ft. in diameter and 65 ft. high, and each has a capacity of 14,338 cu. ft.

In accordance with chemical analysis, slurry is drawn from any of the first four tanks, referred to as receiving tanks, and pumped to either of the last two, in which actual blending is accomplished. Transfer of the slurry throughout this system is handled by a group of 6-in. pumps. From the blending tanks, slurry is transferred to a 60-ft. diameter, 48-ft. high kiln feed tank in which a 3-day supply (6,040 tons) of kiln feed can be accommodated. The kiln feed tank, also of prestressed concrete, and

A view looking toward the burner building. The tank, background, holds coal for the direct-firing coal mill. In the central foreground is the dust collection unit and stack for clinker cooler exhaust.



The fuel-air mixture enters the kiln in a 16¾-in. burner pipe.

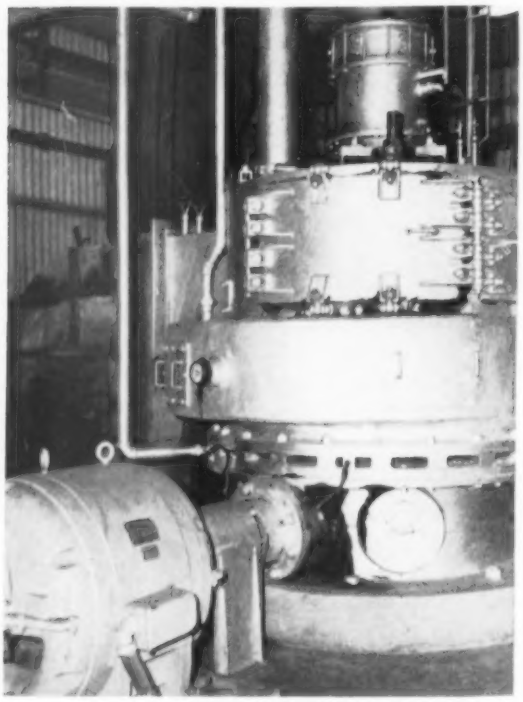


The kiln and cooler control panel. Instrumentation and control for the kiln, cooler, and kiln feeder are provided on this panel.

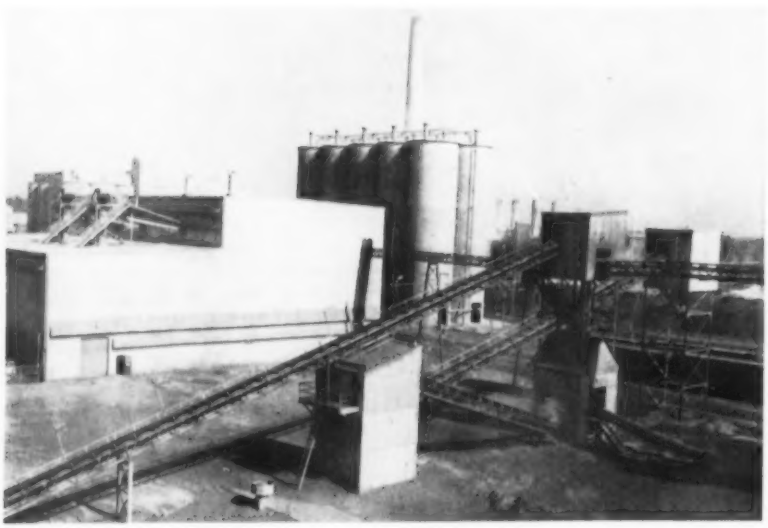
the clay slip storage tank noted previously are equipped with Dorr-Oliver air-mechanical agitators.

A 4-in. pump delivers the slurry through a 6-in. line to the 13-in. Allis-Chalmers ferris wheel feeder above the kiln backhousing. Feeder overflow is returned to the kiln feed tank. A screw conveyor delivers slurry from the feeder to the kiln feed pipe.

The 12- by 450-ft. kiln is coal-fired with a direct-firing Babcock & Wilcox type EL Pulverizer. With drive provided by a pair of 125-hp motors through Falk speed reducers, the kiln is operated at approximately 70 r.p.h. It rides on 7 tires and has a slope of ½ in. per ft. About 14,000 ft. of ¾-in. link chain are installed in a curtain system extending through the first 67 ft. from the feed end. Refractories include a 9-in. 70 percent alumina lining for the first 100 ft. from the discharge end, followed by 6-in. material for another 25 ft. Fireclay brick is used from this point to the chain section, which has 4-in. castable refractory.



Left: Coal for kiln firing is reduced to 93 percent passing 200-mesh in this direct firing mill.



Below: At the right is the clinker-handling and storage system. A stockpiling bridge is out of view to the right. Clinker may also be transferred directly from the conveyor (foreground) to the belt entering the mill building (left background).

Coal is received by rail and rehandled by clamshell to a stockpile near the burner building. Drawn through gates onto a conveyor in an underlying reclaiming tunnel, the coal is transferred to a bucket elevator in which it is raised to discharge over a vibrating screen mounted above a 220-ton storage tank. The 2-in. opening screencloth serves to remove any possible debris carried in with the ½-in. stoker coal. From the storage tank, a rotary table feeder with variable-speed drive set to deliver coal at 9 t.p.h., transfers the fuel to the coal mill.

The latter, driven by a 125-hp., 660 r.p.m. motor, is provided with tempered air from the kiln hood by a 150-hp. American Blower 520 fan. Pulverized coal—83 percent passing 200-mesh—and the primary air is delivered to the 16¾-in. burner pipe by the same blower.

Firing temperature of 2,600 deg. F. is maintained with the 11,200-11,500 B.t.u. fuel, and consumption has averaged slightly more than 100 lb. of coal or 1,100,000 B.t.u. per barrel of clinker. Intermediate temperature (beginning of the chain section) is about 770 to 800 deg. F., and rear end temperature averages 500 deg. F.

Kiln exhaust gases are drawn by a Bayley induced-draft fan, rated at 180,000 c.f.m. at 550 deg. F., through a Western Precipitation Multiclone in combination with a Western Precipitation Cottrell electric precipitator before passing to the 7- by 70-ft. stack. The Multiclone unit is comprised of 45 24-in. cyclones which remove coarser particles from the gas stream, while final clean-up is accomplished in the electrical system, which is two units wide and two sections long.

Kiln instrumentation, consisting primarily of Bailey units, includes an r.p.h. counter; rear, intermediate, and hood temperature gauges; damper setting indicators; kiln and cooler motor ammeters; and gas analyzers.

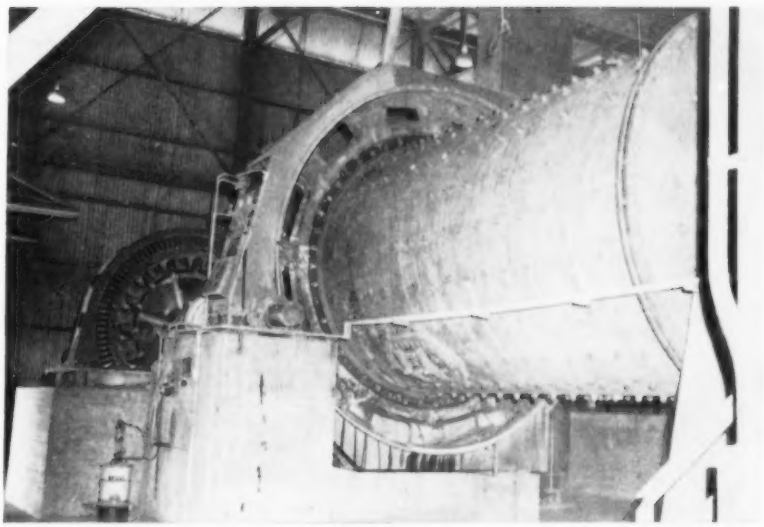
Clinker discharged from the kiln is received in a 6- by 100-ft. Allis-Chalmers air-quenching reciprocat-

ing grate cooler and then passes through a Fuller clinker breaker. Air for cooling is delivered by a Westinghouse Silentvane, and the cooler is vented by a 150-hp. Bayley fan with a rating of 140,000 c.f.m. at 250 deg. F. Cooler exhaust is passed through a Multiclone dust collector before entering the cooler vent stack.

The cooled clinker is received on an 18-in. drag chain conveyor and then transferred to an inclined belt conveyor for transport to a transfer station. From the latter point, the clinker may be delivered to the finish mill department feed belt, or to another conveying system for transport to an outside clinker storage.

In the second system the clinker is distributed from a shuttle conveyor on an underlying 10,000-ton stockpile. A reclaiming tunnel below this storage has seven draw points from which the clinker is transferred by either of two portable 24-in. apron feeders. The tunnel belt delivers reclaimed clinker to a following conveying system on which the material is carried to the mill feed belt.

Equipped with a travelling tripper, the feed belt discharges into a pair of 170-ton clinker storage tanks in the mill building. Another set of two 115-ton tanks are used for gypsum storage. A Merrick Feedoweight below each tank delivers these materials to the feed conveyors for each of the two finish milling circuits. Feed conveyors in all milling circuits are covered and vented to Norblo bag-type dust arrestors.



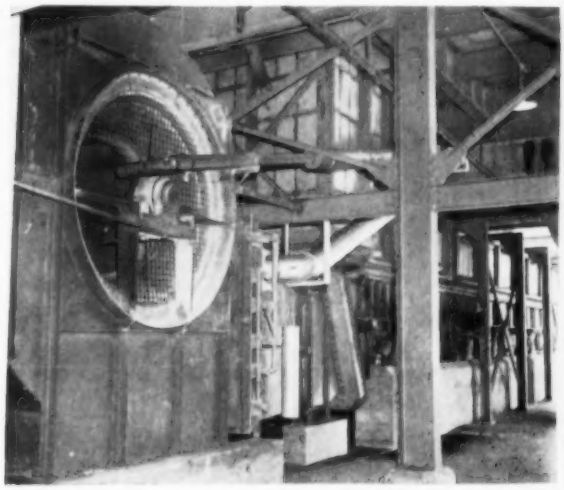
The 10½- by 17-ft. finish mills are charged with 150,000 lb. of 1- to 2½-in. balls, and are driven by 1,000-hp. synchronous motors. Each operates in closed circuit with a 16-ft. air-cooled separator.

The finish mills, 10½- by 17-ft. units driven at 18.3 r.p.m. by 1,000-hp. synchronous motors, are charged with 150,000 lb. of 1- to 2½-in. Moly-Cop balls. Each operates in closed circuit with a 16-ft. air-cooled Raymond double whizzer separator. Each circuit also has a Norblo 8-compartment dust arrestor with 108 bags in each compartment. These are equipped with 21,000-c.f.m. capacity fans that also provide the cooling air to the separators.

Material discharged from the finish mills is transferred *via* Air-

Left: A typical mill feed installation. The feed conveyor (below) in each of the milling circuits is covered and vented to dust arrestors.

Below: The 6- by 100-ft. air-quenching clinker cooler, and the cooling air fan.



slides to bucket elevators and raised to another set of Airslides feeding the separators. Rejects are returned to the mills, while the finished product is chuted to a 7-in. Fuller-Kinyon pump that handles cement from both circuits. Currently, the plant is producing only Type I material, which is pumped through a 6-in. line to the new group of 10 storage silos near the mill building. These silos, each 26-ft. in diameter and 104 ft. high, have a total capacity of 108,000 bbl. No packhouse was included in the construction of the new mill since transfer of cement can be readily made from the above silos to the packhouse and silos of the older operation.

A portable 9-in. Fuller-Kinyon pump operates under each of the two lines of five silos in the new group. Air is provided by C 300 compressors, and both units are used when cement is pumped through the new 8-in. 2,700-ft. long pneumatic system to the barge-loading point by the river. Formerly, rail hopper cars had been used to transport cement from the older plant to the barge-loading site. Here it is discharged into three silos of the same individual capacity as those at the plant. Separate Airslides deliver the cement from each unit to a stationary 8-in. pump, which in turn transfers the material at the rate of 450 bbl. per hour through a 6-in. line and flexible hose connection to company barges. The latter are delivered to company distributing plants upriver at St. Louis, and downstream at Memphis, Tenn.

As opposed to the older mill which uses waste heat boilers for a part of its power, the new operation is furnished entirely with purchased power. This is brought to plant substation at 34,500 v. The new Cape mill is operated by a crew of 33 men.

BELT FAILURES?
Switch to
NEW YORK RUBBER!

New York Rubber, famous since 1851, manufactures belt designed to meet trouble—and overcome it! Built for the most severe service demands, there's a New York Rubber belt designed to solve *your* problem. Mineral mining, quarrying, coal mining—these activities often require a belt that will show superior resistance to sharp and abrasive materials, frequently in the presence of oil and grease conditions. Fire, too, takes its toll of conventional belts.

That's why it will pay you to investigate New York Rubber. A brief description of four of our most popular belts follows. Write on your letterhead for more complete details on these and other superior New York Rubber Belts.

REDUCE FAILURES
with these New York Rubber belts:

STONORE—Highest quality, for most severe service. Handles heavy ores, trap rock, crushed stone, coarse broken glass, slag, cement clinkers, direct feed from digging and mining machinery. Mildew-proof.

DEPENDABLE—For handling coal both under and above ground, sand and gravel, trap rock, sulphur, lime and limestone. Ideal for sub-zero temperatures. Mildew-proof.

NEOPRENE—Resists oil and grease conditions adverse to natural rubber. Handles caustics and coal briquettes. Heat-resistant to 250°F. Mildew-proof.

TEMP-PRENE*—A neoprene compounded for fire resistance and severe, rough surfaces. Mildew-proof.

*Acceptance designation: "Fire Resistant, U.S.B.M. No. 28-11".

NY RUBBER
NEW YORK RUBBER
CORPORATION
Established 1851
100 PARK AVENUE • NEW YORK 17, NEW YORK

Enter 160 on card, page 211

New Arkansas Cement Corp. To Begin Operating This Fall

Construction of the Arkansas Cement Corporation's new cement manufacturing plant near Foreman, in southwestern Arkansas, reportedly has reached the half-way mark. Initial capacity will be 1,400,000 bbl. of cement annually.

A subsidiary of the Arkansas Louisiana Gas Company, the Arkansas Cement Corporation entered the cement field following extensive engineering and market studies conducted by Kaiser Engineers and the staff of the gas company.

Officers of the Arkansas Cement Corporation are Edward N. Henderson, president; William T. Murphy Jr., chairman of the board; Frank L. Holleman, secretary and treasurer; and Raymond H. Thornton, assistant secretary and assistant treasurer.

Walter Gray, a veteran cement industry executive, who was appointed sales consultant, is forming the sales staff of the company in Little Rock, Ark. Both Charles Winning, plant superintendent, and Harry Gingerich, chief chemist, were engaged in the mineral processing field before they assumed their present positions.

Four Cement Companies Call Men Back to Work After Temporary Halts

Four cement companies have recalled employees to plants which had been shutdown temporarily.

Alpha Portland Cement Company recalled the entire work force of more than 300 men when operations were resumed at its plant in Martins Creek, Pa., after a two-week layoff.

Three-fourths of the employees were called back to work at the Lone Star Cement Corporation's plant in Concrete, Wash. Production was halted last summer because of a surplus of cement. This plant is now producing at two-thirds of its normal rate.

Keystone Portland Cement Company recalled 120 workers to its plant in Bath, Pa.

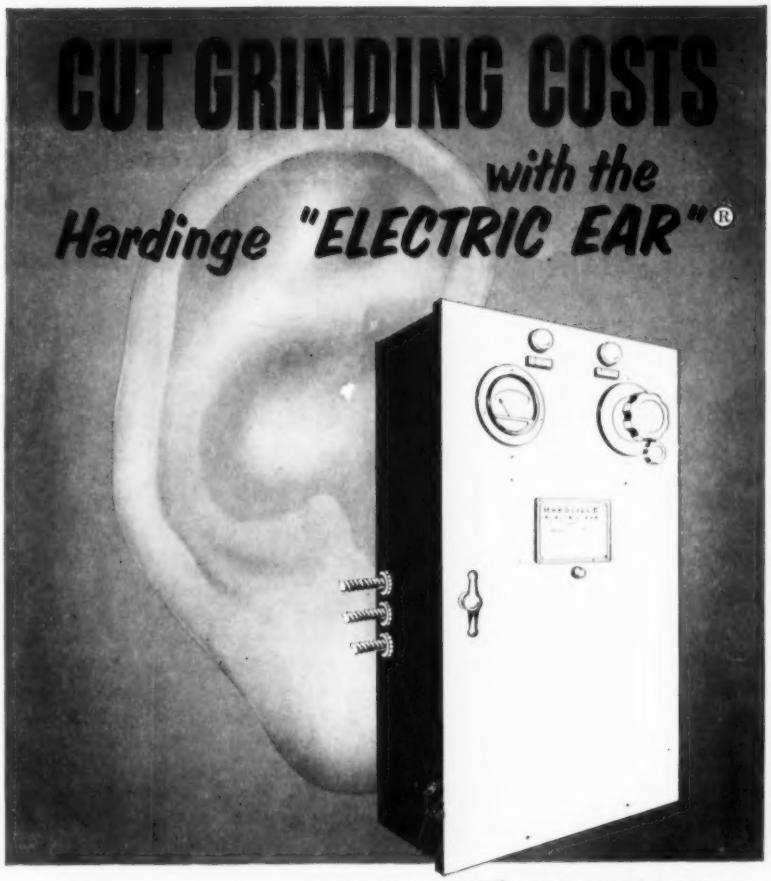
At the Penn-Dixie Cement Corporation's plant in Buffalo, N. Y., 155 men returned to work. The plant is operating at full production after a two-week shut-down.

Park Land Given Government By British Columbia Cement

The British Columbia Cement Company Limited has donated 30 acres of park area, shaded by trees and fronted by a sandy beach, to the people of the province of British Columbia. The land, which will become a part of the Provincial Park system, is located 25 miles north of Victoria, B. C.

B. F. Cox, vice-president and general manager, pointed out that the company is following a precedent established when Mrs. R. P. Butchard, wife of the first president of British Columbia Cement, developed Victoria's internationally-known Butchart gardens to cover the scars left by an old quarry.

The Ash Grove Lime and Portland Cement Company's plant in Springfield, Mo., recently received the National Safety Council Certificate of Commendation. This award is given to plants having injury-free records covering a period of one or more calendar years and totalling 200,000 to 1,000,000 man-hours. In April the plant achieved the outstanding total of 3,000 days without a lost-time accident.



Users report 10 to 15% INCREASE in their GRINDING MILL CAPACITY

In a recent survey of Hardinge "Electric Ear" users, many of them reported 10% to 15% increased grinding mill capacity after installing an "Electric Ear." This unit controls the mill feed, based upon grinding sound level, to produce optimum grinding conditions.

Here are a few typical statements from satisfied customers:

"This unit is doing a remarkable job. It reduces steel and liner consumption. We estimate a savings, with our two units, of $6000 per year on grinding balls and liners. Capacity gained 10%."

"Approximately 25% gain in capacity."

"Helps prevent plug-ups."

"Maintains uniform mill load. Estimated gain in capacity 10%."

"We feel this unit is essential to our operation from a proper quality control standpoint. We would not be able to keep up our present rate of accelerated production and quality without it."

"'Electric Ear' is helpful when inexperienced grinders are learning to operate the mills."

"Eliminates human element in mill feed level."

"Saving per year—$10,000.00."

"Principal reason for 'Electric Ear' use is that it aids the operator, and the mill can be operated from a remote panel."

Write for Hardinge Catalog No. 42-A-8.

HARDINGE
COMPANY, INCORPORATED

YORK, PENNSYLVANIA · 240 ARCH ST. · Main Office and Works

New York · Toronto · Chicago · Hibbing · Houston · Salt Lake City · San Francisco · Birmingham · Jacksonville Beach

Enter 161 on card, page 211

Nuclear Gauge Sees Through Slurry Pipe To Control Density

By HARRY F. UTLEY

NUCLEAR science has this year come to the aid of the wet-process cement industry with a sensing and control system which maintains the water content of the slurry at any desired percentage at all times. Measurement is made through nuclear-energy absorption, with control performed pneumatically.

At least one manufacturer, Permanente Cement Company of Oakland, Calif., has already obtained delivery of the equipment for plant installation at an early date.

Density is read through the slurry pipeline without physical contact, affording a continuous record of density without time loss for sampling or testing in the laboratory. Control is fully automatic, without time lag. Results are anticipated in the form of uniformity of product, fuel economy through elimination of excess water in the kiln feed, and minimizing of mill plugging.

The nuclear density gauge is supplied by Bendix Aviation Corporation, Cincinnati Division, with recording and control instrumentation devised by Minneapolis-Honeywell, Brown Instrument Division.

Operation depends upon the fact that different densities of materials cut down nuclear radiation intensity by different amounts. The thicker the material, the fewer the rays that can get through. The density gauge shoots nuclear radiation through the pipe carrying the slurry. If the slurry develops a tendency to thicken, the ion chamber receives fewer rays. Immediately, the controller notes this change in density and adjusts an air signal to the water valve, allowing enough extra water to flow to bring the mixture back to the desired point.

Source of the nuclear radiation is *cesium 137*, the designation for a metallic salt containing the radioactive isotope of cesium. As cesium 137 slowly disintegrates, it emits *beta* and *gamma* particles. The beta particles have relatively low energy and are all absorbed in the slurry pipe itself. Beta rays, therefore, take no part in measurement or control. The gamma radiation, however, has much greater penetrating power and readily passes through the slurry and both thicknesses of the pipe wall.

Gamma rays are detected by the ionization chamber of the gauge. These rays have the property of ionizing a gas in proportion to their strength. The amount of ionization, in turn, determines the amount of current that flows between the two electrodes in the chamber. This minute current is amplified and then recorded on the ElectroniK instrument as a measure of density, specific gravity, or percentage of water or solids.

Cesium 137 is used as the radioactive source because of its convenient energy level and because of its long 33-yr. half life. Means are provided to compensate for the gradual decay of the source; however, need for adjustments are rare, according to Bendix Aviation technicians, since the error that develops in a year is only 2 percent.

A heavy mounting bracket is necessary to assure utmost accuracy of alignment between the radioactive cesium and the ionizing chamber, and this bracket will fit a 4- to 12-in. diameter pipe. A layer of 2½ in. of lead shields all radiation except that beamed at the stainless steel ion chamber.

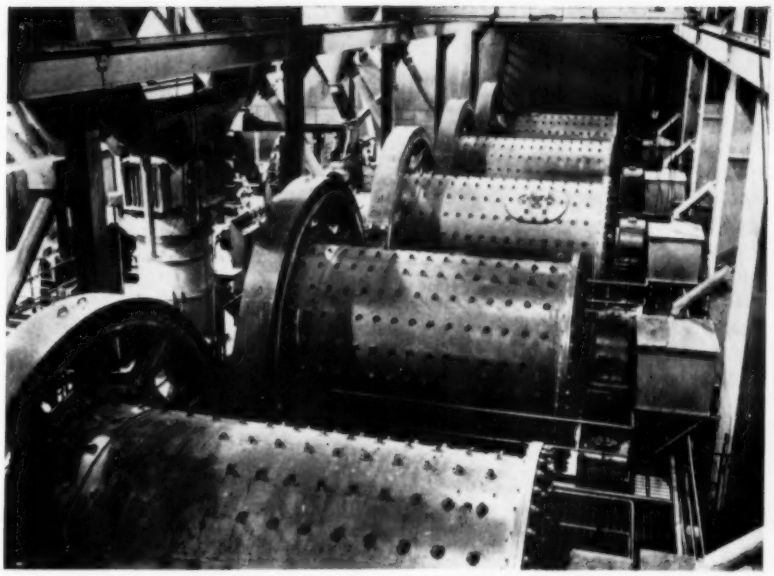
The nuclear-source holder is said to meet all Atomic Energy Commission requirements for safety. In no case can the slurry itself become radioactive. An indicator knob permits the radiation beam to be turned "off" or "on." A single conductor cable is the only connection needed for the sensing element, and the control cabinet may be as far away as 1,000 ft. from the sensing head.

Control of water percentage to 35, plus or minus ½ percent, has been achieved; and control to within ¼ percent is said to be feasible. When desired, the controller scale can be calibrated 30 to 40 as a percentage measure of water content.

A year ago the writer detailed in story and picture the new Cushenbury plant of Permanente Cement Co. (PIT AND QUARRY, July, 1957, *Permanente's New Plant Features True Laboratory Control*). The outstanding feature, remote control of raw-mix proportioning, might have shared honors with another control factor—the automatic regulation of slurry density by nuclear means—had the device been installed at the time. In anticipation, a brief description of this most advanced of regulatory methods was included for the first time in any publication serving the portland-cement industry.

Since then, the nuclear density gauge has become available to effect precise control of the water content of slurry. The accompanying article reveals some *modus operandi* details.

—The Editors



Two 10½- by 15-ft. raw-grinding ball mills (foreground) and three 10½- by 16-ft. ball mills installed in a large cement plant. The clinker-grinding mill in the middle is equipped with spiral liners.

Factors in Design
Of Cement Plant Milling Rooms

Design of new mill departments and modernization of existing installations should take advantage of recent important developments and overall trends in the cement industry

By C. A. ROWLAND
Supervisor
Grinding Machinery Section
Allis-Chalmers Mfg. Co.

ESTABLISHING the mill room design best suited to operation is most often the responsibility of the engineering department, guided by an accurate analysis of information from other sections of the company. The sales department predicts demands in volume and type of cement. Operations may conduct a power study to determine the most power-efficient operating procedure. Both research and operations contribute toward mill selection.

These factors should then be applied to take advantage of recent individual developments and overall industry trends such as we shall discuss below. Ideally, this will lead to a mill room design which provides maximum production for the least capital investment . . . and that will give the lowest operating cost.

One Single Mill Room Many new plants and modernized older plants have been designed to install both raw- and finish-milling sections in one room. In dry-process plants single compartment ball mills have been used. In wet-process plants all multi-compartment (*Compeb*) mills may be employed, or a combination of multi-compartment for raw grinding and ball mills for finish.

Regardless of cement process or

type of mill, the single mill room has several advantages:

- It minimizes the space required for the milling department by using only one building, an arrangement which reduces building cost and gives the maximum capacity for the space utilized. Locating all the milling departments in one building also permits using one area for stocking grinding media and spare parts.
- It permits consolidating all grinding operations in one location. This reduces operating labor costs, since one crew can operate both raw- and finish-grinding sections. Furthermore, one central control point for all milling operations can give better control over the entire grinding operation.
- A single mill location simplifies maintenance. In many instances, only one overhead crane is required to service all of the mills.
- It consolidates a majority of the equipment requiring high voltage motors, thereby simplifying the electrical distribution system.

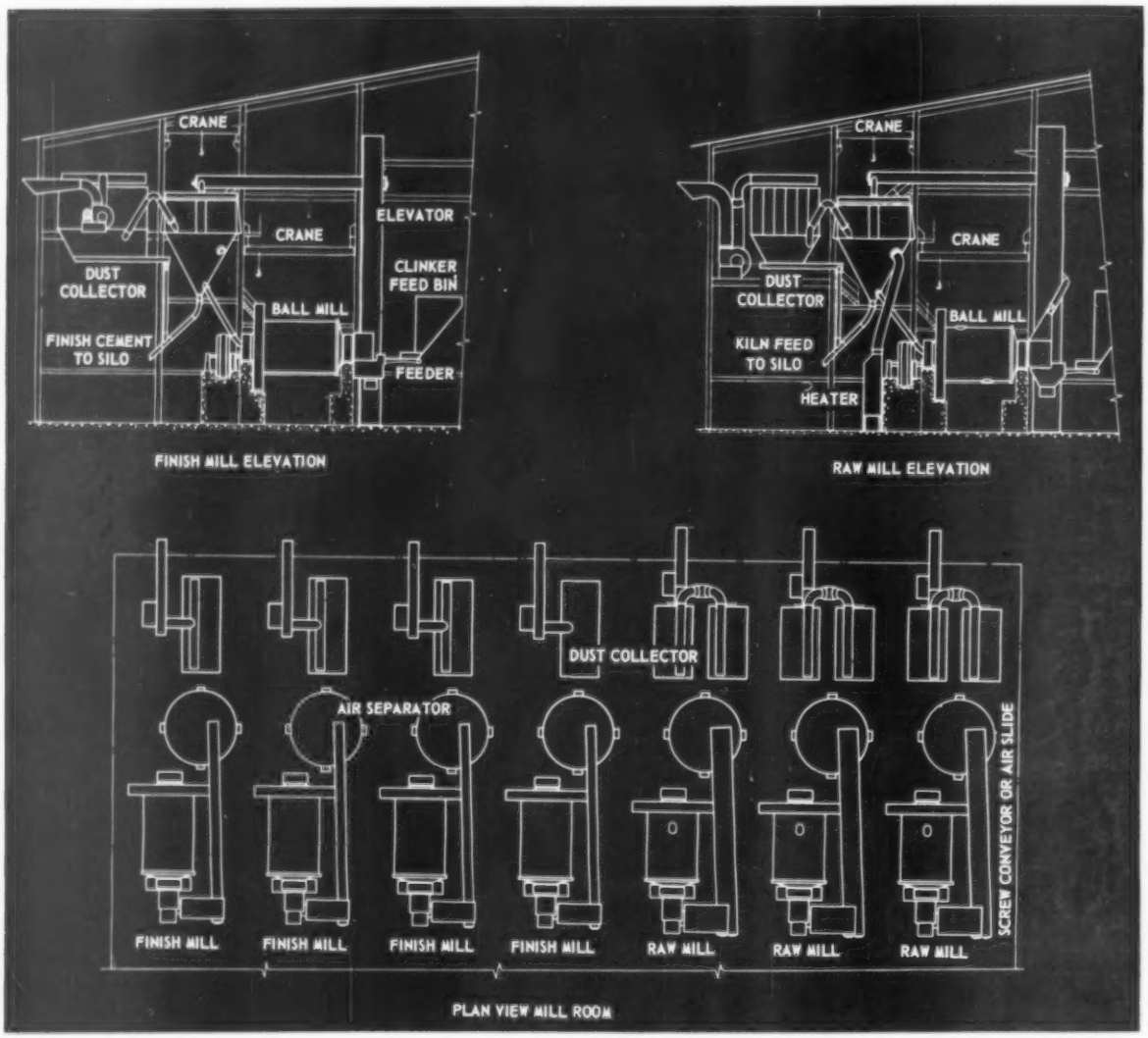
Duplication Of Mill Parts In the selection of new raw- and finish-grinding mills for a proposed plant, duplication of mills should be seriously considered. At the very least, duplication simplifies mill room layout, particularly if both raw and finish mills are in one room.

In dry-process cement plants, ball mills of identical size for both raw- and finish-grinding can be installed. The ball mill is best if either drying or cooling in the air separator is to be considered. Compartment mills are frequently applied in wet-process plants, but raw and finish mills can be essential duplicates, allowing for 2- to 4-ft. difference in length and a difference in discharge arrangements. All replacement parts can be duplicates.

Even wet-process plants using a combination of compartment mills for raw-grinding and ball mills for finish-grinding can still select their mills to draw the same power, making it possible to obtain duplicate motors, gears, pinions, and couplings.

Duplication of mill room machin-

A plan view of a modern mill room, with finish- and raw-mill elevations.



ery reduces the size of the spare parts inventory by reducing the variety of parts required. It also permits carrying fewer parts for more mills. For example, a plant with two raw mills and three finish mills, all the same size, need carry only one spare pinion shaft assembly, one spare trunnion bearing shell, one lot of motor parts, and, if desired, a single gear. These are spare parts that are carried for emergency purposes; and although they may not be used for a number of years, they can tie up a considerable amount of money. Thus duplication can both reduce the number of wearing parts carried in stock and create a better turnover of these parts.

One cement manufacturing company with several plants has gone even farther with duplication by starting a program of duplication of mills in all of its plants. The decision to do this was made after an analysis of existing operations showed a large investment in spare parts for mills of a number of different sizes.

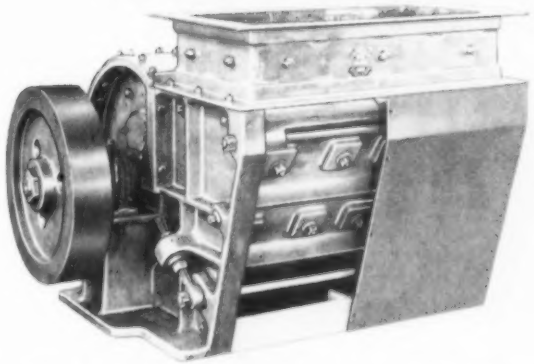
Eventually, all new wet-grinding compartment mills will be one size and all of the new dry-grinding ball mills will be of one size. All wet- and dry-grinding mills will draw the same power, and wherever this is possible they will have duplicate motors. The raw- and finish-grinding mills are all designed to have the same drives, including the gear and pinion.

Finally, it is planned to carry all spare parts except liners, grates, and grinding media in one central location. This plan will minimize the amount of spare parts which have to be carried, but necessary replacement parts will still be readily available for an emergency.

Off-Peak Power In many areas, power companies are giving reduced rates for industrial use of power during periods when the load on the power company's system is low. Although these periods vary with localities, lower off-peak power rates will usually apply for a 12- to 16-hour period.

Savings resulting from the use of off-peak power should be studied in selecting mills for a new plant or for a modernized existing plant, as the grinding mills in a cement plant

American's 30 SERIES HAMMERMILL



for high volume reduction with minimum maintenance rely on hammermills backed by American's 50 years of experience.

Write for American's bulletin BETTER STONE CRUSHING

American PULVERIZER COMPANY
ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS
1059 MACKLIND AVE. ST. LOUIS 10, MO.

Enter 165-A on card, page 211

TRIAL SAMPLES

Of World-Famous WHITMORE'S Lubricants NOW IN AEROSOL SPRAY-ON CANS!

HANDI-LUBE LIQUID GEAR COMPOSITION

For open gears, sliding surfaces—exclusive formulas eliminate metal to metal contact, keep wear on the lubricant not the metal—no breakdown even after prolonged use under water—available for every climatic condition—packaged in handy 16-oz. aerosol spray-on containers or in bulk containers—send for a free trial sample.

WIRE ROPE SPRAY LUBRICANT

Exclusive formulas for lubricating and protecting wire rope, chain, springs. Penetrates to the core of wire rope minimizing internal friction and increasing usable life up to 300%; —special protective qualities absolutely eliminate corrosion—non-gumming qualities reduce "carry-back"—packaged in handy 16 oz. aerosol spray-on containers or in bulk containers—send for a free trial sample.

65 YEARS OF LEADERSHIP LUBRICATING THE FOLLOWING.

- Open Gears, Dipper Sticks, Cams
- Enclosed Gear Cases
- Wire Rope and Cable
- Hydraulic Units, Torque Converters
- Roller, Ball, and Sleeve Bearings
- Speed Reducers

Est. 1893
THE WHITMORE MANUFACTURING CO.
LUBRICATING ENGINEERS
CLEVELAND 4, OHIO, U.S.A. PHONE: VULCAN 3-7272

Enter 165-B on card, page 211

NORDBERG Cement Mill MACHINERY

...quality-built to give you longer service life—lower operating costs

Recognized by the cement industry for its quality construction and resulting ability to assure maximum, continuous production at low operating cost is the extensive line of dependable Nordberg machinery.

Nordberg cement machinery includes Symons® Gyratory Crushers for primary crushing of raw materials; Symons Standard and Short Head Crushers for preparation of finely, uniformly sized raw mill feed; Symons Vibrating Grizzlies and Screens for scalping and sizing; wet and dry grinding rod, ball, tube and compartment mills; rotary dryers, kilns and coolers.

For dependable, low cost power, a complete line of Nordberg Diesels, in sizes to more than 11,000 hp are available to meet practically any cement industry power requirement.

If you are looking for ways to increase operating efficiency and lower production costs, it will pay you to investigate the advantages of Nordberg machinery and the technical engineering services available.

SEND FOR CEMENT BROCHURE

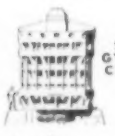
This brochure illustrates the full line of quality Nordberg machinery designed and built for more efficient cement plant operation. Write for your copy today.

NORDBERG MFG. CO., Milwaukee 1, Wisconsin

NORDBERG

© 1958, N.M.Co. Q158

ATLANTA • CLEVELAND • DALLAS • DULUTH • HOUSTON • KANSAS CITY
MINNEAPOLIS • NEW ORLEANS • NEW YORK • ST. LOUIS • SAN FRANCISCO
TAMPA • WASHINGTON • TORONTO • VANCOUVER • GENEVA • JOHANNESURG
LONDON • MEXICO, D.F.

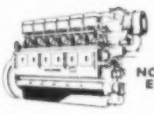

SYMONS GYRATORY CRUSHERS

SYMONS CONE CRUSHERS

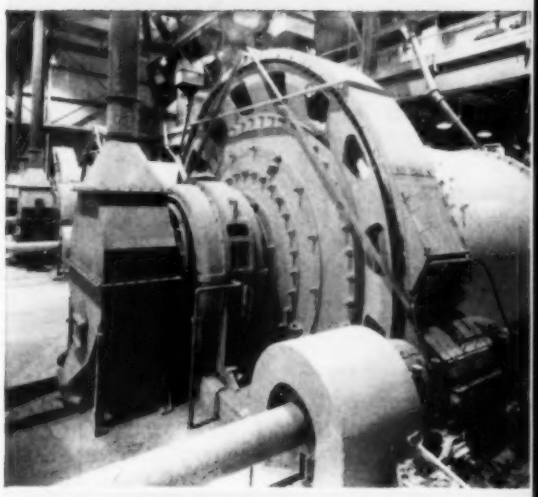
NORDBERG MINE HOISTS

SYMONS VIBRATING GRIZZLIES

SYMONS VIBRATING SCREENS


NORDBERG ENGINES

Enter 166 on card, page 211

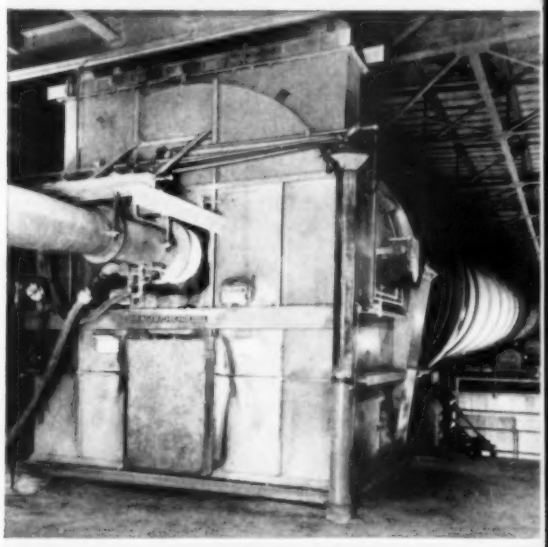


Directly above is a view showing one of three 11′ x 17′ Nordberg Grinding Mills recently installed for finish grinding operations at a large Midwest cement plant.

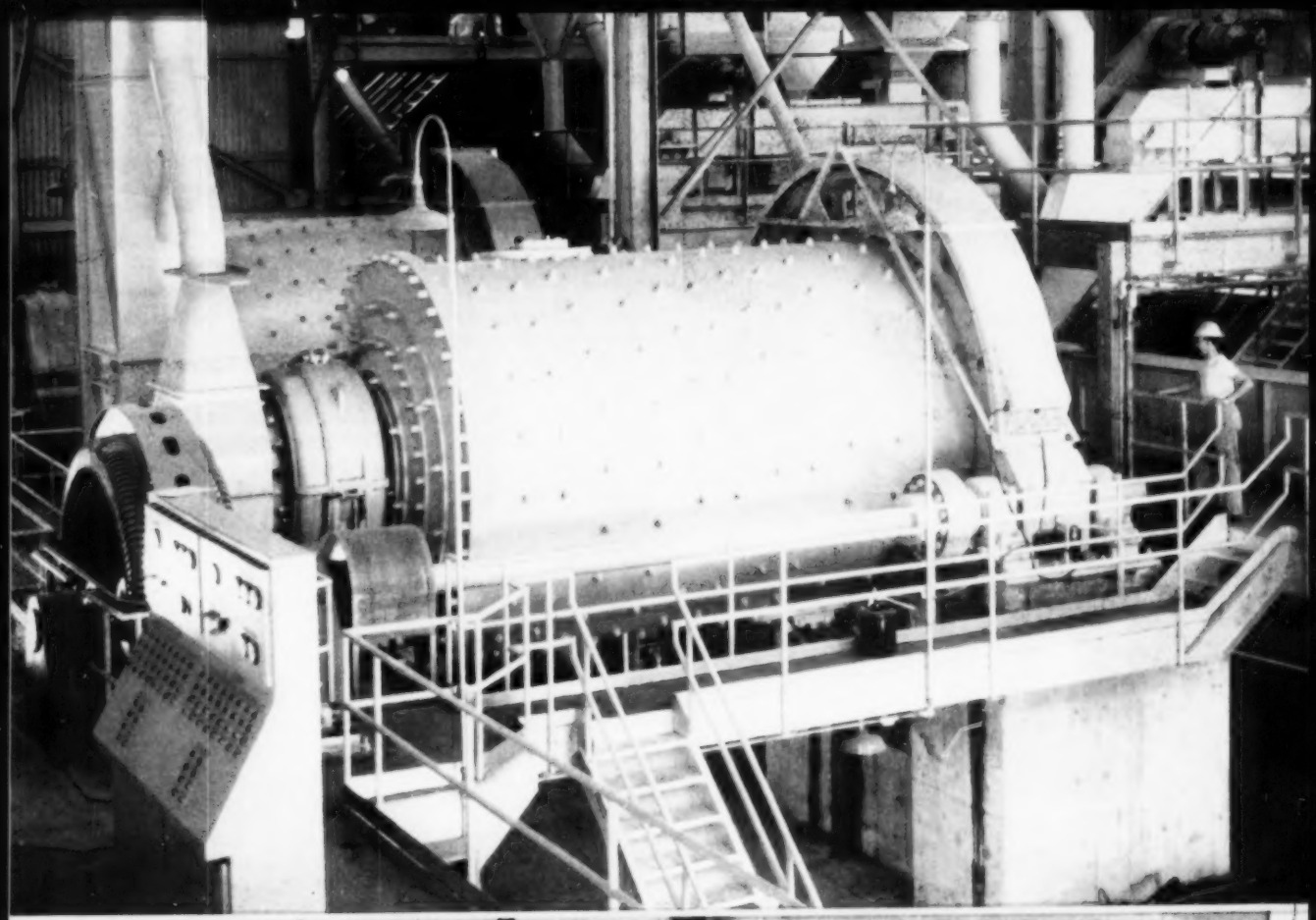
The large illustration at the right shows part of a group of five 11′ x 17′ Nordberg Grinding Mills installed for dry process service at a newly completed cement plant.

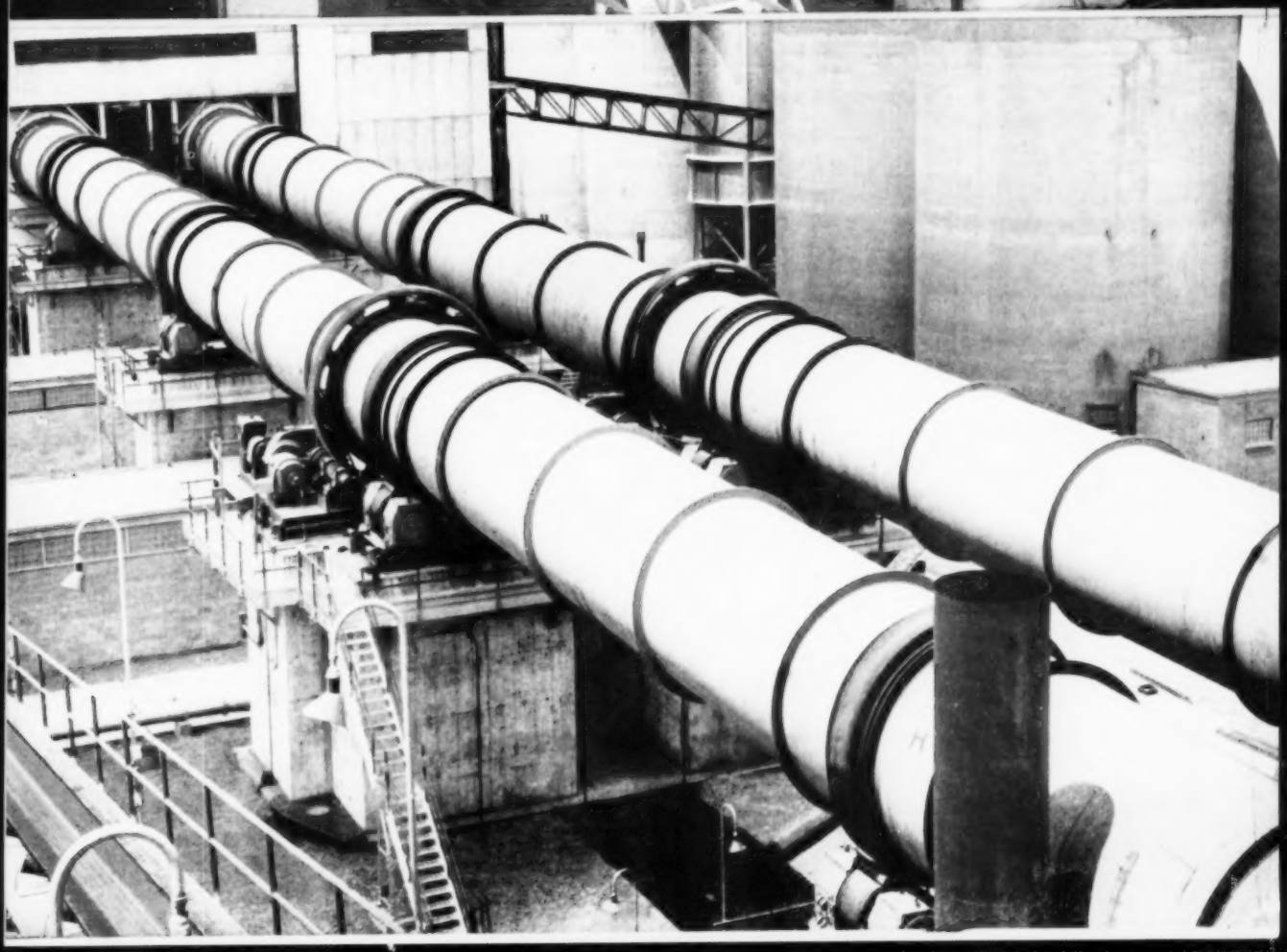
Illustrated at the right are two 11′ diameter x 360′ Nordberg Rotary Kilns installed during the recent expansion of a large Midwestern Portland Cement plant.

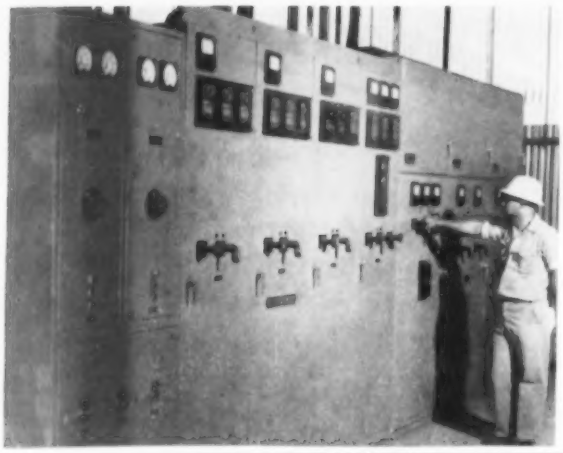
Shown directly below is a close-up view of a new Nordberg Rotary Kiln used in cement processing. Shown from the firing hood end, this unit measures 11′ in diameter x 380′ in length.



SYMONS **. . . a registered Nordberg trademark known throughout the world.**







A d.c. panel for excitation and inching, 4.16-kv. vertical lift metal-clad switch gear, and Type H synchronous mill motor starters with inching control.

10 MERRICK FEEDOWEIGHTS

MODERNIZATION PROGRAM at a leading cement plant includes MERRICK Feedoweights . . .

FEEDOWEIGHT handling clinker.

This cement plant recently completed a three-year modernization and expansion program.

This giant project employs 5 MERRICK Feedweights* for rock, sand and ore—5 other Feedoweights for clinker, gypsum and masonry rock.

FEEDOWEIGHT handling sand and iron ore.

In scores of industries, a host of miscellaneous raw materials are accurately fed, blended and proportioned by weight—thanks to the superlative performance of MERRICK Feedoweights.

MERRICK Weightometers* provide precise and continuous weight records of materials in transit. Applicable to any size belt conveyor, horizontal or inclined.

Finely engineered and ruggedly built, these reliable units maintain high output and product uniformity. They are easily installed—operate smoothly on any job—insure minimum power and upkeep costs. Established for over 50 years, MERRICK Scales are "on location" all over the globe. Many countries consider them legal weighing instruments.

*Reg. U. S. Pat. Office

Write for Bulletins 253, 375, and 158

MERRICK SCALE MFG. CO.
180 AUTUMN STREET • PASSAIC, NEW JERSEY

Enter 168 on card, page 211

consume the greater part of the power required by the entire plant.

A grinding schedule can be made up to take full advantage of this fact. Instead of working on a 6- or 7-day week, 22 hours a day, this would mean calculating a capacity on the basis of a 16-hour day for 5 days a week, with Saturday and Sunday figured on a 22- or 24-hour basis.

Most of the mills could then be scheduled to run during off-peak periods, holding the power requirement during peak demand periods to such a level that no penalty is paid for drawing excess power, but high enough to maintain a satisfactory power factor within the plant. (Grinding mills are most frequently driven by synchronous motors, one of the advantages being power factor correction, since the rest of the motors in a cement plant are induction motors, which tend to pull down the overall power factor.)

In addition to the saving in power costs, a mill room designed for the use of off-peak power provides 8 hours a day for preventive and minor maintenance on all the equipment in the mill room. This is a maintenance superintendent's dream! It reduces the amount of emergency breakdowns and actually reduces the time required for major shutdowns. Maintenance labor costs are further reduced by permitting the greater part of the maintenance to be done on a straight time basis, this reducing the amount of overtime for emergency breakdowns.

Another advantage of off-peak power is that excess capacity is available. This gives approximately 40 hours per week of grinding capacity that can be utilized by sacrificing the advantages of using off-peak power. If there is space available for ample additional mills, the reserve capacity available due to off-peak power should be kept as a contingency reserve and should not be figured in an expansion or for excess capacity calculations. The use of the reserve capacity available due to off-peak power can be held for sudden changes in production demand or short-time, high-capacity demands.

Thus a mill room design which best utilizes off-peak power can easily provide these important bene-

fits: lower power costs, lower maintenance costs, and greater available excess capacity. At the same time, however, such a design does mean the selection of larger mills and a higher capital investment.

Expansion and Excess Capacity Plant expansions should always be considered in design. When new cement plants are designed, doubling or tripling capacity at some time in the future is often contemplated. Modernization of old plants may be made to increase the capacity or reduce the operating costs — maybe both. Anticipating projected space and capacity needs avoids the future problem of where to locate mills.

While this expanded grinding capacity must be based upon ultimate kiln capacity, three other factors should be considered:

1. The increasing demand for high-early-strength and other finely ground specialty products. These often require the addition of stone, slag, or other special materials, which reduces the consumption of clinker. At the same time, the power consumption required per barrel produced increases, compared to Type I cement. Without adequate milling capacity, the amount of clinker in storage increases.

2. The ACL traveling grate and other preheating system can be applied to existing kilns, considerably increasing kiln capacity without requiring the space of a new kiln. These systems would require the installation of ample raw- and finish-grinding capacity to meet the increased kiln demand and production.

3. Seasonal demand for cement brings up several problems, *e.g.*, the principal question: Is it cheaper to build ample silos and hold the cement ground during the periods of low sales, or to store clinker outside during periods of low sales and install ample excess grinding capacity to meet seasonal demands? The answer is peculiar to each plant and locality, but the matter must be considered in grinding mill selection.

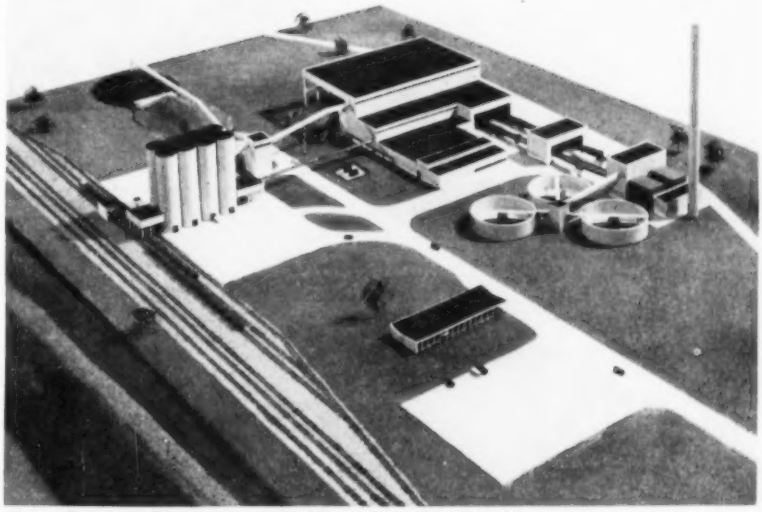
Expansion Pattern Finally, the room should be planned to grow *from the middle out*, with ample area at the ends of the building for adding new mills and enlarging the building. The principle is to install No. 1 raw-mill and No. 1 finish-mill adjacent to each other at approximately the middle of the building and then have the plant grow out from this point.

In modernizing old plants, it is not always possible or practicable to follow this procedure, but in making the layouts, provisions should be made for additional mills. This is particularly true on the finish end, where so many cement production variables indicate the need for excess grinding capacity. With changing market conditions and the demand for more and more of the finer products, any excess finish grinding capacity is most often adequately utilized.

Controls Another important trend is towards control centers, particularly if all the mills are located in one room. These centers vary from simple layouts to quite elaborate setups with large panel boards. Industrial television has been applied. The more elaborate control arrangements in particular are often located in clean, dust-free, air-conditioned enclosures from which the mill room may or may not be visible. Such control centers have

NICHOLSON IS BUILDING
AT DUNDEE

New Plant for
DUNDEE CEMENT COMPANY



New Cement Plant being built at Dundee, Mich.

NICHOLSON broke ground in June 1958, working under a tight schedule and in close cooperation with owner's engineers (and representatives) to bring this plant into early production.

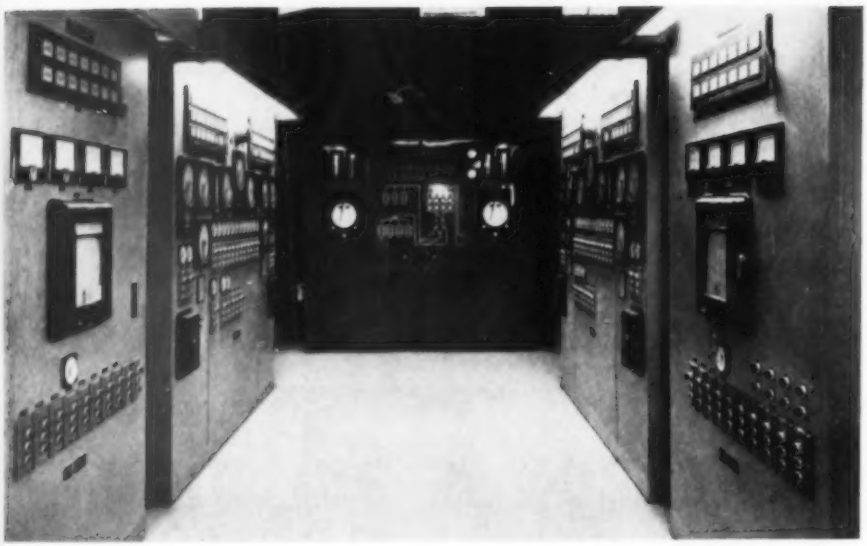
NICHOLSON has completed many projects for cement companies in its 44 years as specialists in this field and has been especially active the last few years during the rapid expansion of the cement industry.

Consider **NICHOLSON** for your next construction project.

THE NICHOLSON CO.

10 ROCKEFELLER PLAZA **NEW YORK 20, N. Y.**

Enter 169 on card, page 211



This mill control center in a cement plant is one of the most modern and complete. The four panels at the sides control motors and raw material feed scales, and indicate such items as motor temperature and bin levels of ground product. Actual motor control centers at this plant are in a separate enclosed room under positive pressure.

many advantages and reports indicate their value.

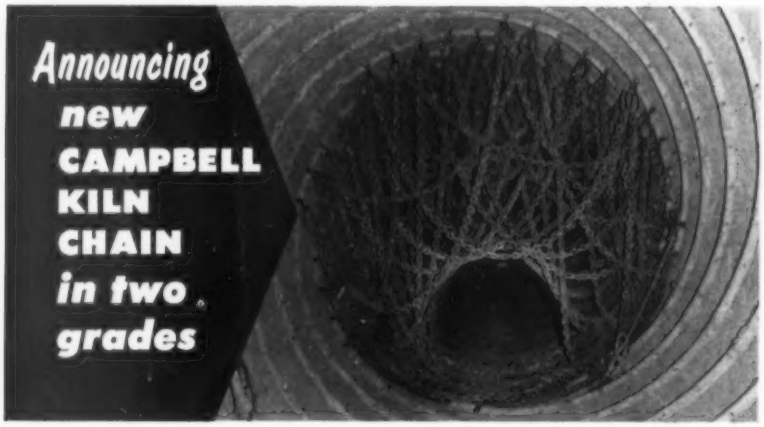
A number of devices have been developed for controlling mill feed rate by mill sound, mill vibration, motor loads, and other expedients. The reports on the success of these devices indicate that they perform their function but have not yet reached the stage at which the need for an operator is eliminated. Successful mill operation still depends a great deal upon human skill and ability.

The operator's tools are his own ears and a few simple indicating ammeters for critical motors in the circuit. By the sound of the mill, he can tell how the mill is operating. Through the use of the mill motor ammeter he can tell what the load is in the mill, and a change in power indicates to him changes that have to be made in the operation. Co-ordination of mill sound and power readings is an operating art that has been developed from years of experience.

A further help is the ammeter for elevator, air separator, and classifier motors, as an indication of build-up or falling off of circulating load and of adjustments required in the feed rate.

Finally, some control centers are not located so that the operator can refer quickly to the critical meters he needs. In such cases, it is suggested that a small panel with the important indicating meters be installed at a convenient spot near each mill, probably the feed end, to give the operator this immediate access. Then, by means of a communication system with the control center or by having the feeder controls at the feed end of the mill itself, feed rates can be readily changed as required. Such an arrangement gives the operator full control over individual mill circuits, while the central control section still maintains overall control of the entire grinding operation.

An accurate analysis of the operating needs of the individual plant must consider the advantages of single mill room construction, duplication of mill parts, off-peak power use, anticipation of expansion and increased capacity, and efficient use and location of controls. All these factors are important guides to maximum production for minimum capital expenditure—and lowest operating cost.



Carbon Steel...and New Thermal-Abrasive Resistant No. 7

Now, Campbell Kiln Chain is available in two types of material—and in Proof Coil, BBB or Passing Link styles. All can be supplied to fit any chain system currently in use, and all Campbell components for attaching chain within the kiln can be supplied to the same physical specifications as the chain desired.

CAMPBELL CHAIN

For further information, contact your nearest Campbell representative, or write the Engineering Division in York, Pennsylvania.

CAMPBELL CHAIN *Company*

York, Pa.—West Burlington, Iowa • East Cambridge, Mass., Chicago, Ill. Portland, Ore., Seattle, Wash., Los Angeles, Sacramento, San Francisco, Calif.

Makers of Jiffy Lug-Reinforced Tire Chains and Blue Temper pre-cut, packaged chain

Enter 170 on card, page 211

Have you made YOUR contribution to the Navy-Marine Corps Memorial Stadium?

The Naval Academy Athletic Association is now raising funds for a new Navy-Marine Corps Memorial Stadium, scheduled for completion late in 1959. The total cost of the project will be $3,100,000.

Rear Admiral W. R. Smedley III, co-ordinator of the stadium project, has announced that $500,000 is still needed before construction can be completed.

Individuals as well as companies are invited to donate any amount they wish. However, contributions of $100, $500, $1,000 or more will be eligible for the following honors and memorials. (All contributions are tax deductible).

MEMORIAL CHAIR — $100

For any person, officer or enlisted, who has served in the Navy or Marine Corps. Inscription on back of chair will give name, rank and dates of service.

INDIVIDUAL DONATION OF $500

Will entitle donor to lifetime dues-free membership in the Naval Academy Athletic Association. Only a limited number of these special memberships are available.

CONTRIBUTIONS OF $1,000

A company or other organization may dedicate a plaque to employees or members who have served in the Navy or Marine Corp.

MEDAL OF HONOR PLAQUES — $1,000

Special plaques may be dedicated to Navy or Marine Corps holders of the Congressional Medal of Honor.

For further information write:

Rear Admiral W. R. Smedberg III
Memorial Stadium Project
P. O. Box 777
Annapolis, Maryland

This announcement published as a public service by Pit and Quarry Publications, Inc.

S. W. Portland Cement Co. To Erect Office Building At El Paso Operation

Southwestern Portland Cement Company of El Paso, Tex., has awarded a contract for the construction of a new plant office building to J. E. Morgan and Sons.

The new building will be erected directly in front of the existing plant office, which will be remodeled. All company personnel will be housed in the two units, co-ordinating all the plant's operations in one center.

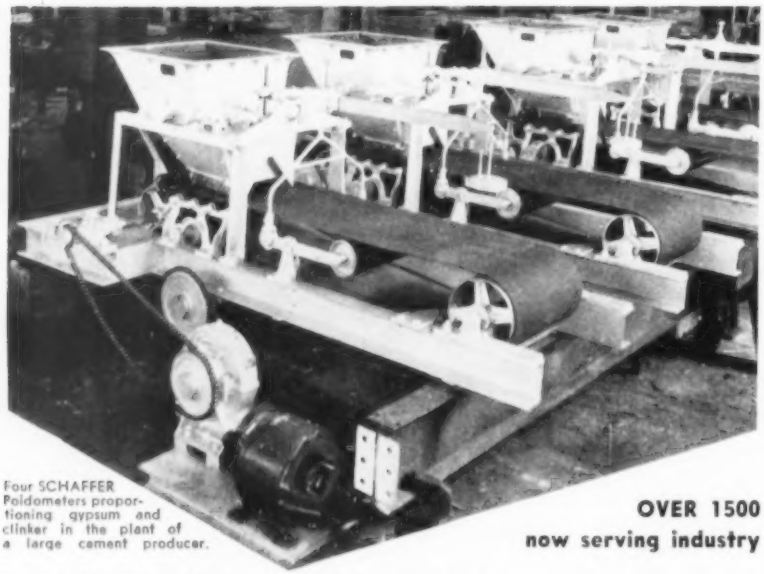
As the structure will rest on reinforced concrete columns or stilts, parking area will be provided below the offices. It will also contain reception rooms and laboratory and engineering facilities. The building is expected to be ready for occupancy January 1, 1959.

Directors of the Ideal Cement Company, Denver, Colo., recently re-elected CRIS DOBBINS president at the organization's quarterly meeting held in Houston, Tex. All other officers were also re-elected.

"PACEMAKERS" for Efficient Scaling

Schaffer POIDOMETERS

preferred by leading CEMENT PRODUCERS



Four SCHAFFER Poidometers proportioning gypsum and clinker in the plant of a large cement producer.

OVER 1500 now serving industry

WEIGHING • RECORDING • BLENDING
MIXING • PROPORTIONING • FEEDING

Catalog No. 5 has full details

Cement projects in every continent rely on SCHAFFER Poidometers to provide vital weight-data, boost output, and insure product uniformity.

Noted for speed, accuracy and automatic operation, Poidometers keep the "kinks" out of production lines.

These completely reliable, easily installed machines are designed and built for years of continuous, high-economy service. Available with total weight recorders, and remote control devices for showing and changing feed rate.

SCHAFFER POIDOMETER CO., 2828 Smallman St., Pittsburgh 22, Pa.

Enter 172 on card, page 211

Permanente Cement Company Revises Color Film on Cement

Permanente Cement Company's documentary industrial film, *Cement —Stone of the Ages,* has been completely revised and is now available to interested groups in the West.

The 25-minute color movie follows the development of the cement industry from the stone age to the age of powered missiles.

Some outstanding western construction projects using various types of portland and special cements are shown. The complex processes of cement manufacturing are outlined, along with the huge transportation and distribution network necessary to move cement to its markets.

The film was produced by Flagg Films under the direction of Permanente's advertising and technical departments. It is available to groups in the 11 western states and territories on request from Permanente sales offices or head office in Oakland, Calif.

Sales Organization Set Up For Riverside-Arizona Co.

C. D. Bishop and Donald E. Muir, representatives of the Riverside Cement Company have been appointed to set up the sales organization for the Riverside-Arizona Cement Company's plant being erected at Clarkdale, Ariz.

Fisher Contracting Company of Phoenix, is building the Riverside-Arizona plant, which will supply cement for the Glen Canyon Dam.

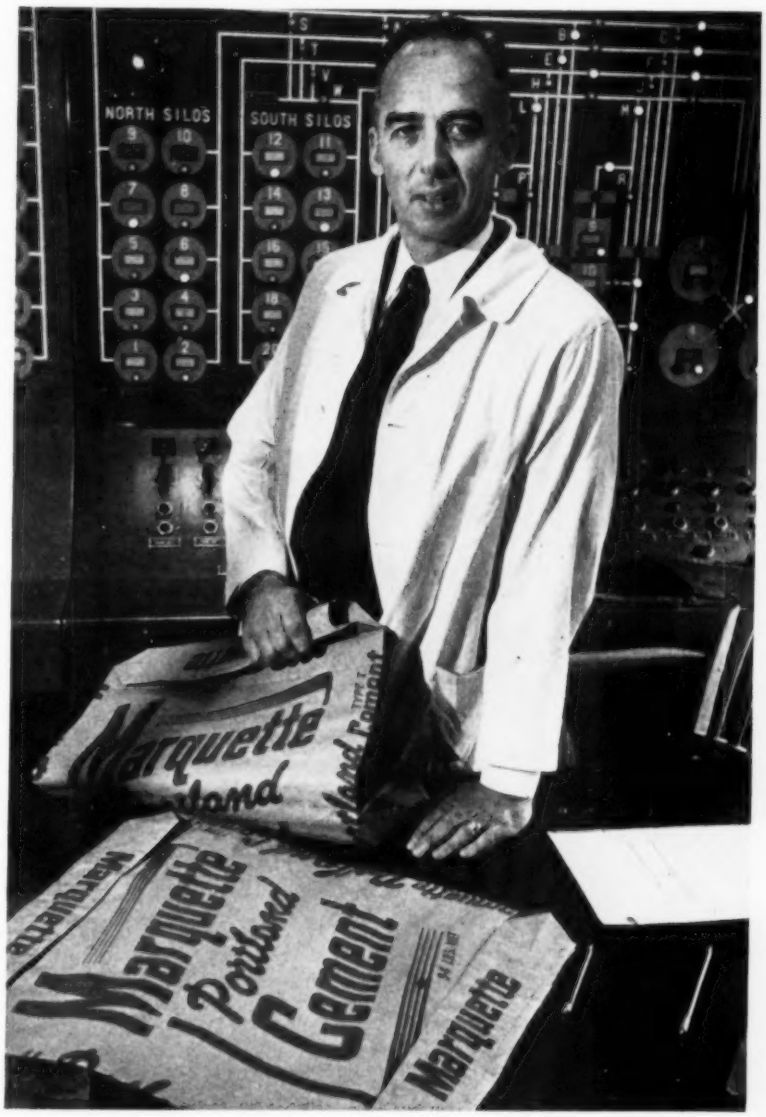
Both the Riverside Cement Co. and the Riverside-Arizona Cement Co. are divisions of the American Cement Corporation.

Gift of Ages, a new color-sound movie of the operations of the Ohio Lime Company, Woodville, Ohio, was given an award for excellence by the Film Council of Greater Columbus, Ohio. The film was produced by Austin Productions, Inc., Lima, Ohio.

Crushed Rock Products, Inc., Cornelius, Oreg., has been purchased by Walter Mauch, owner of Asphalt Paving Company of Forest Grove, Oreg., and Kenneth Smith.

"Bemis STEPPED-END Multiwalls perform a service for our customers . . . and so for us . . ."

SAYS E. E. STORMER, OF MARQUETTE CEMENT MFG. CO.



"The same benefits we encountered by using Bemis STEPPED-END Pasted Valve Multiwalls in our plant operation turned out to be benefits to our customers, too"... says Mr. Stormer, purchasing agent for Marquette Cement. "We like Bemis STEPPED-END Bags because they pack better and stay cleaner. Naturally, our customers are also in favor of cement bags that don't sift and get dusty. Cars stay cleaner and the bags are easier to handle."

Although Marquette officials now consider the use of these bags *primarily* as a service to customers, they still look upon them as a major improvement in their packing operation, as well. Bemis STEPPED-END bags pack better because of the Diamond O construction, stepped corners and the hand insert.

GOT ANY OF THESE PROBLEMS IN *YOUR* PLANT?

- Valve openings stuck closed . . . causing lower production and loss of bags
- Slowed production (up to 25%) due to certain types of valve inserts catching on packing spouts
- Spurting and puffing of cement at corner opposite valve during packing
- Dusty packages on account of leakage from ends and valve opening
- Bags sticking together in bale or pallet, slowing production
- Excessive breakage (more than 1 bag in 1,000 is excessive)

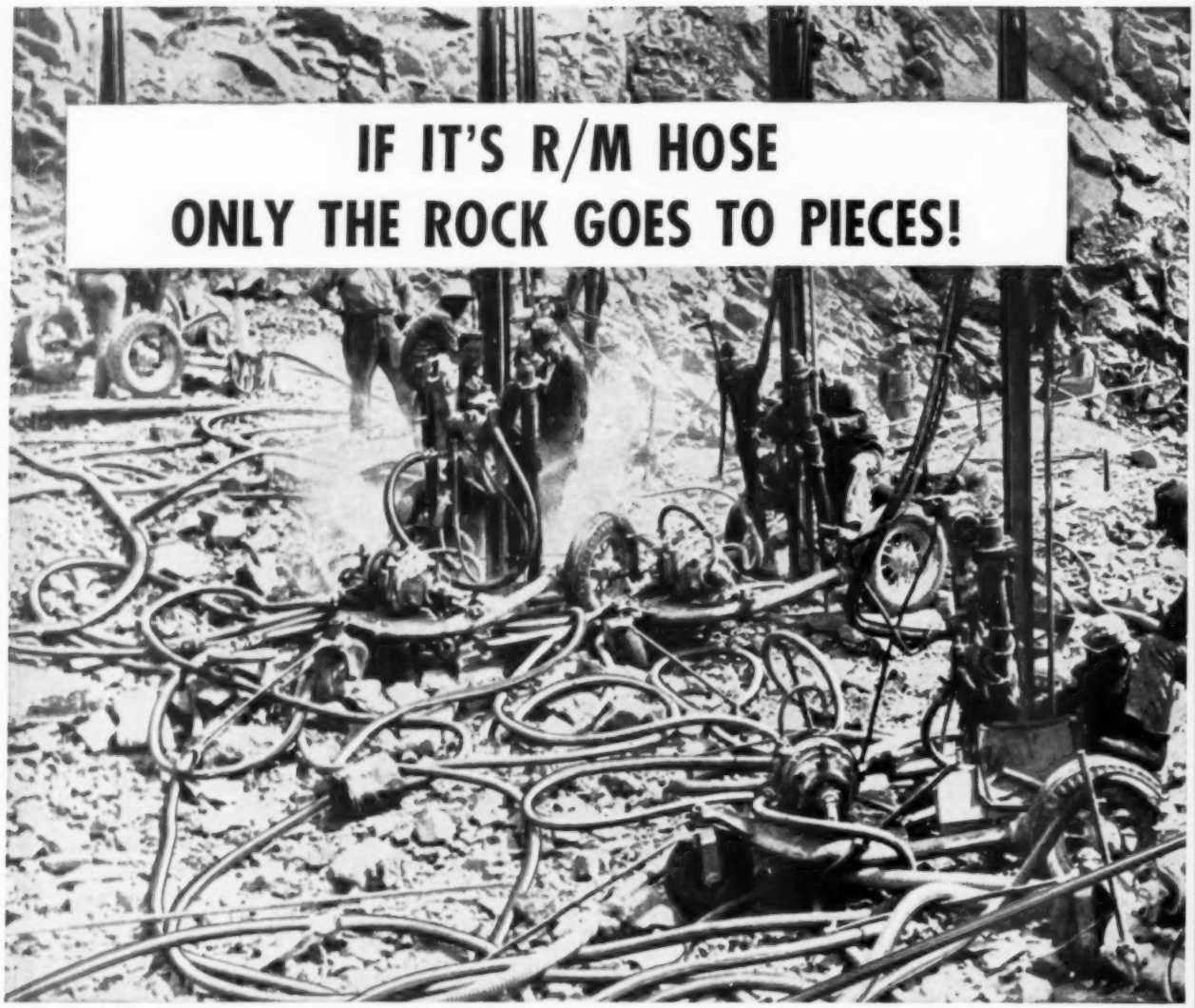
Got any of those problems?
Sure you have . . . maybe all of 'em.

YOU CAN ELIMINATE ALL 6 BY USING *BEMIS STEPPED-END MULTIWALLS.*

Ask your Bemis Man for the *complete* story.

Bemis

General Offices — 408 Pine St., St. Louis 2, Mo. • Sales Offices in Principal Cities



Long Life features of HOMOFLEX HOSE Assure

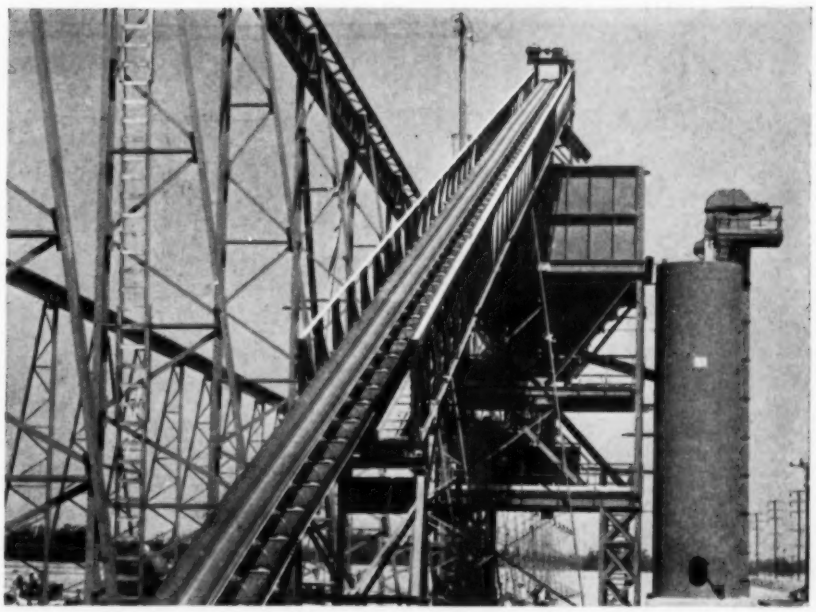
for Your

"More Use ~~per~~ Dollar"

Rugged Homoflex Hose is R/M's exclusive construction for use with air, water, other fluids and gases. Strong enough to stand up under the toughest conditions, yet light in weight and flexible as a rope for easier handling . . . even on the roughest, rockiest job site. Exclusive R/M features make Homoflex Hose do a *better* job . . . and *last longer.*

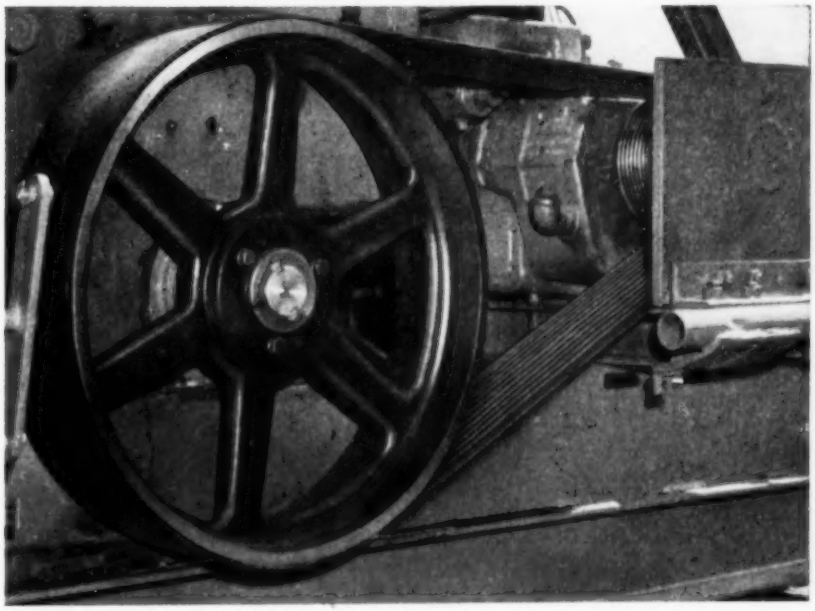
- Mandrel-Made — No Pre-Set Twist, Extremely Flexible
- Inseparable Cover, Strength Member and Tube
- Coils and Uncoils Freely in *Any* Direction, Resists Kinking
- Balanced Homogeneous Construction Throughout
- Uniform Inside and Outside Diameters — Easier Coupling
- Withstands High Pressures and Surges with Wide Margin of Safety

R/M has a hose construction engineered to meet *every* job requirement. Write for Bulletin #6879.



RAY-MAN CONVEYOR BELT — Tough, flexible Ray-Man resists gouging and tearing. Double compensation relieves stress on outer belt plies . . . assures longer belt life and lower cost. High fastener holding ability. Other types available for every bulk materials handling requirement. Write for Bulletins.

R/M POLY-V® DRIVE — New, patented heavy duty drive delivers up to 50% more power in the same space as conventional multiple V-drive . . . equal power in as little as ⅔ the space. Single unit V-ribbed belt design eliminates multiple-belt "length matching" problems. More constant speed ratios, less wear on belt and sheaves, smoother running. Write for Bulletin #6638.



Inseparable Cover, Strength Member and Tube
Balanced Homogeneous Construction Throughout
Coils and Uncoils Freely in Any Direction, Resists Kinking

*Poly-V is a registered Raybestos-Manhattan Trademark.

RM 802

BELTS • HOSE • ROLL COVERINGS • TANK LININGS • INDUSTRIAL RUBBER SPECIALTIES

MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

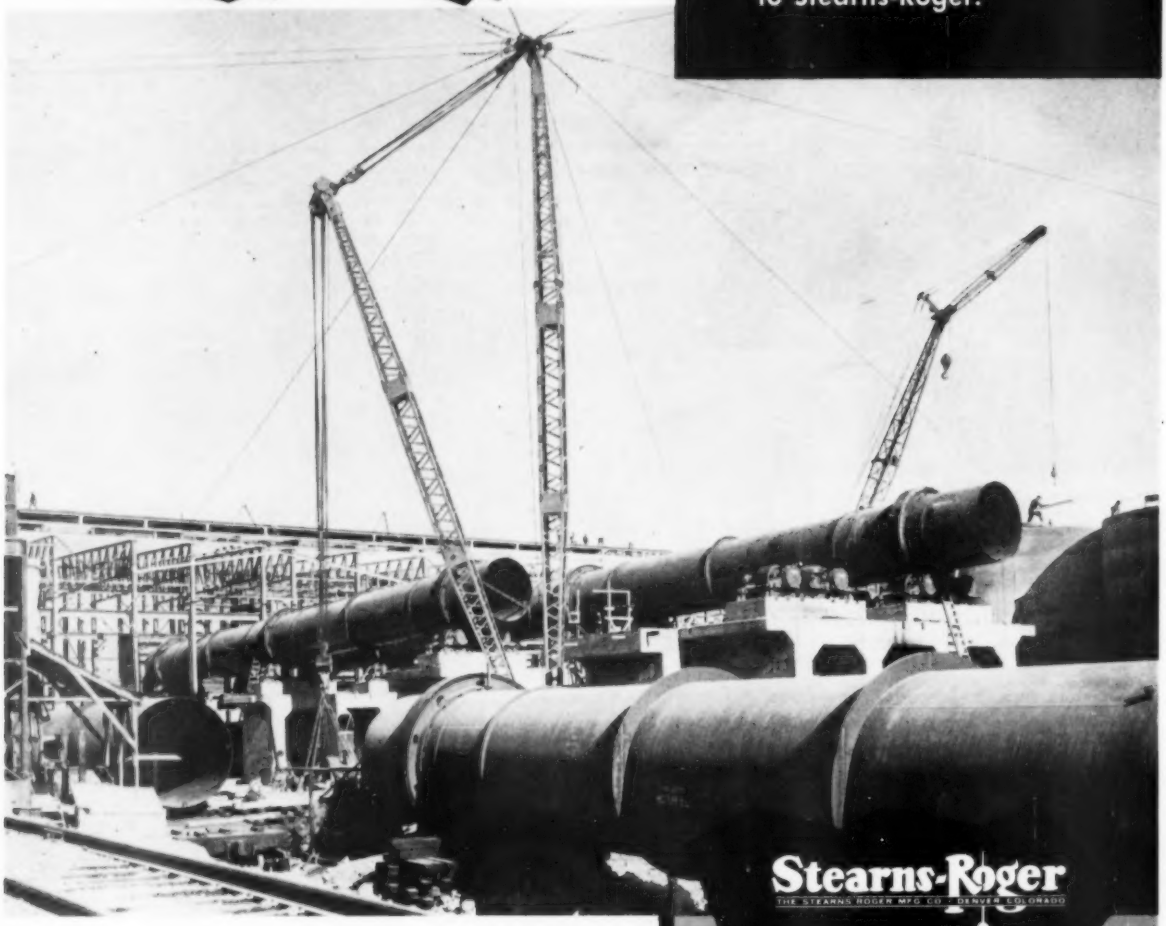
Other R/M products: Abrasive and Diamond Wheels • Brake Blocks and Linings • Clutch Facings • Asbestos Textiles • Mechanical Packings • Engineered Plastics • Sintered Metal Products • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls

STEARNS-ROGER BUILT

for

THOUSANDS OF BARRELS OF CLINKER

Two cement kilns each ten feet in diameter by four hundred feet long represent but one step in Stearns-Roger's complete service for design, engineering, fabrication and construction of cement plants. Call on the skill of qualified engineers working from long experience. For a smooth running plant, give the assignment to Stearns-Roger.



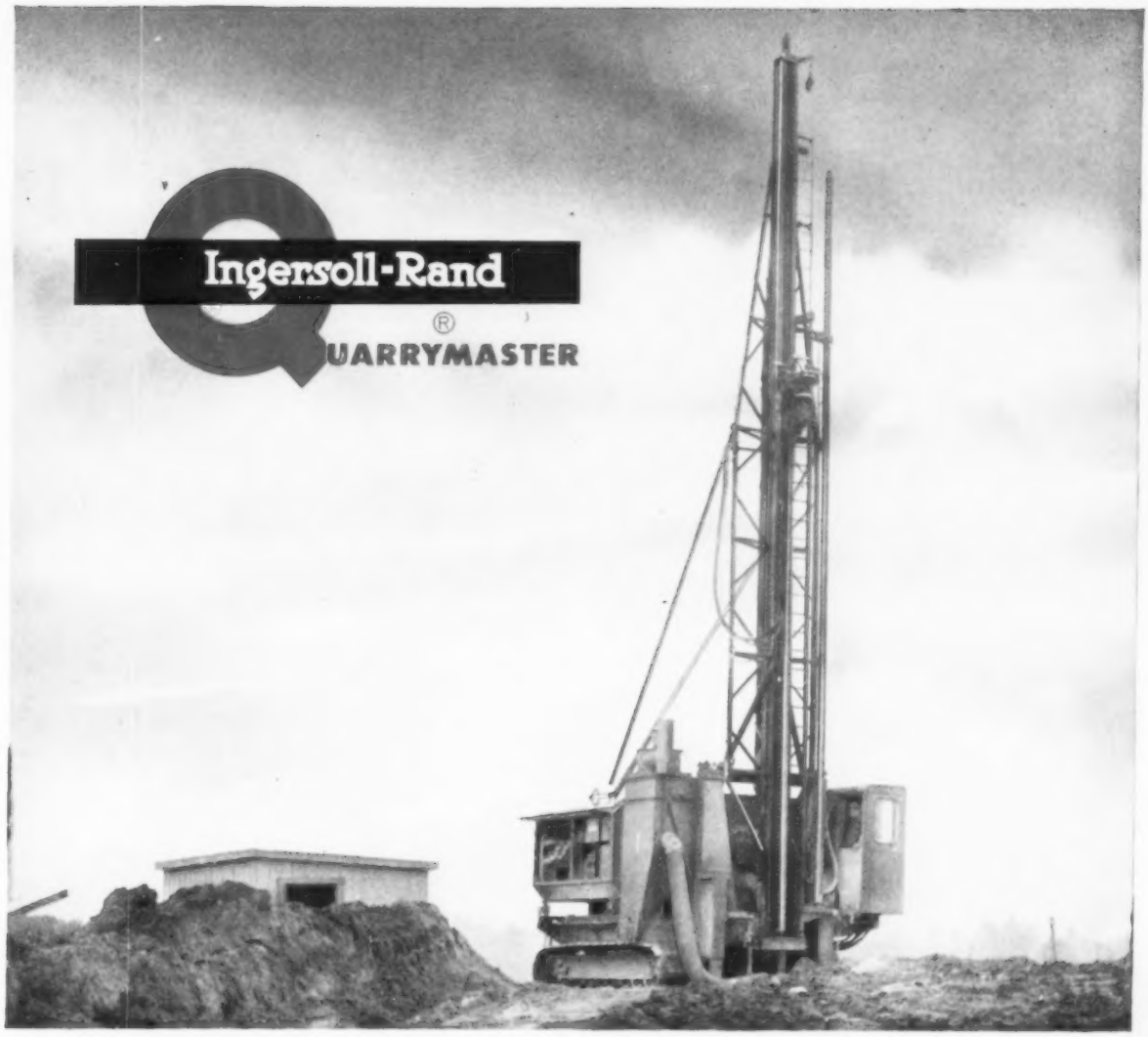
Stearns-Roger

THE STEARNS ROGER MFG. CO. · DENVER, COLORADO

Design, Engineering, Fabrication, Procurement, Construction

DENVER, HOUSTON, EL PASO, SALT LAKE CITY

STEARNS-ROGER ENGINEERING COMPANY, LTD., CALGARY



"DOWN THE HOLE DRILL" PERFORMANCE

Results in Two Repeat Orders

An Ingersoll-Rand Quarrymaster in Quebec, Canada, is now at work drilling the extremely hard and abrasive quartzite cap rock formation overlying an extensive magnetite iron ore body. This machine utilizing an I-R DHD-400 "down the hole drill" and 7 inch Carset bits has averaged 15 to 20 feet of hole per hour since the unit went into operation last spring.

Test holes in the Magnetite iron ore indicate that overall drilling speed in the ore will be twice that in the cap rock. In the ore body the face height will be 25 feet.

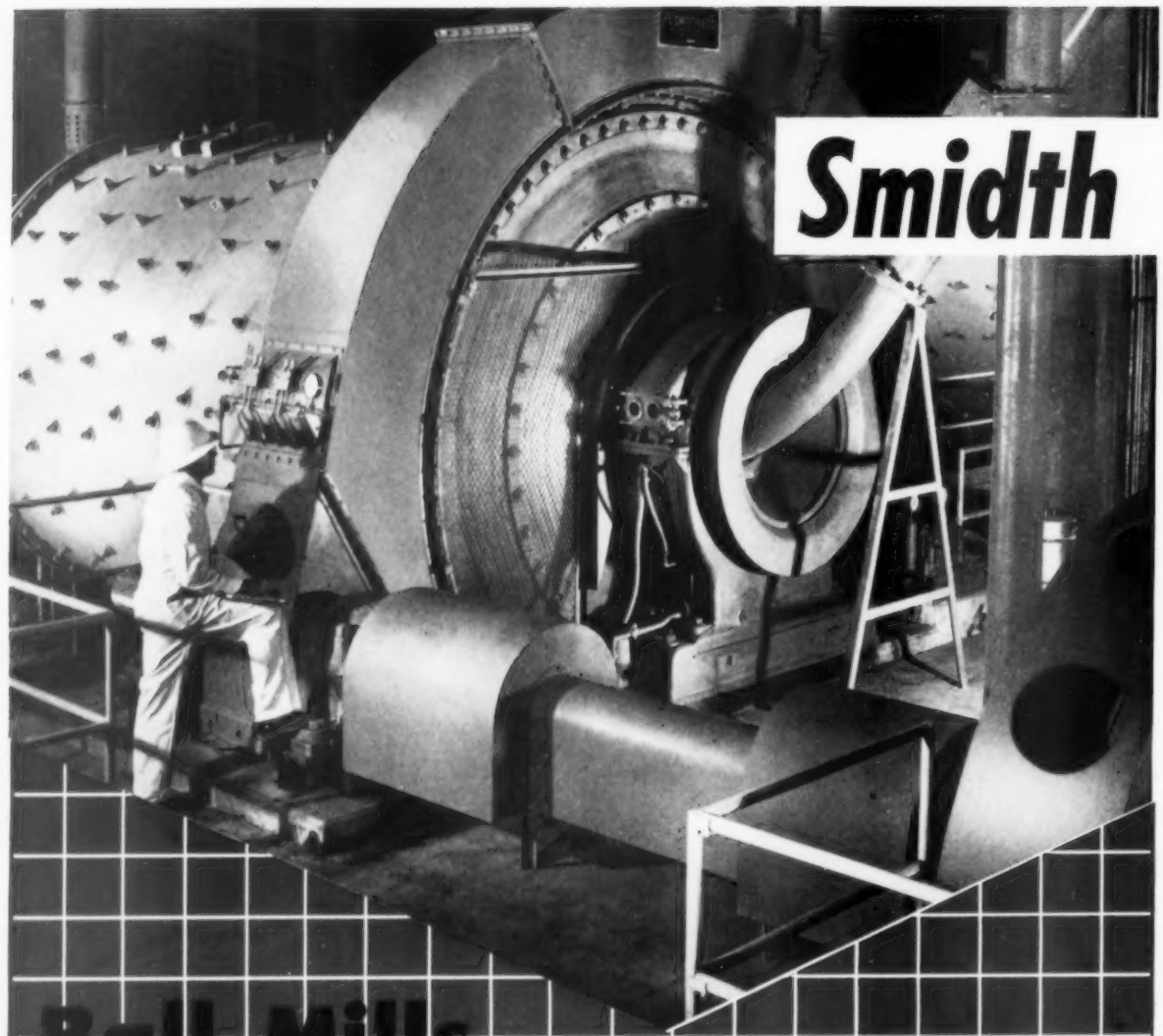
Based on the performance of the first unit over the past six months, two additional units are now on order. Phone or write your I-R man today requesting full particulars on the high tonnage performance of this and other Quarrymaster installations.

Ingersoll-Rand

5-747 11 Broadway, New York 4, N. Y.

DRIFTERS • JACKDRILLS • JACKHAMERS • CRAWL-IR DRILLS • CARSET BITS • AIR TOOLS • COMPRESSORS

Enter 177 on card, page 211



Smidth

Ball Mills

F. L. SMIDTH & CO.

Engineers and Machinery Manufacturers

11 West 42nd Street • New York, N.Y.

F. L. Smidth & Co., A/S
77 Vigerslev Alle
Copenhagen, Denmark

F. L. Smidth & Co., Ltd.,
105, Piccadilly,
London, W. 1, England

F. L. Smidth & Cie France
80 Rue Taitbout
Paris (9e) France

F. L. Smidth & Co. (Bombay) Private Ltd.
42 Queen's Road
Bombay, India

F. L. Smidth & Co. of Canada, Ltd.
11 West 42nd Street
New York 36, N. Y.

Enter 178 on card, page 211

Production and Value Of Sand and Gravel in 1957

By KENNETH E. TOBIN, JR.
Associate Executive Secretary
National Sand and Gravel Association

THE National Sand and Gravel Association has completed its fifth annual survey of the production and value of sand and gravel. This survey is designated to fill the need for current measurement of the contribution which the sand and gravel industry makes each year to the national economy.

Questionnaires were sent to the 1,463 sand and gravel companies in the United States and Canada of whom we have record. It should be noted that Canadian totals are included in the tables for the first time this year, pursuant to requests for such data from Canadian members. Returns were received from 564 companies, operating 976 plants. Limited data were also available on 40 member companies which did not return the questionnaire. These statistics have been incorporated in the study wherever possible, making a total participation of 604, or 41 per cent of the companies surveyed. We believe the reporting companies produced a majority of the total commercial sand and gravel tonnage in 1957.

Attached are four tables which reflect the results of our survey. Table 1 shows the reporting companies produced 216,462,438 tons, valued at $238,781,682, or an average of $1.10 per ton. The results of our 1955 and 1956 surveys are also included in Table 1. Our 1957 survey reveals that sand and gravel production last year declined, as compared with production in 1956 (239,795,334 tons) by 23,332,896 tons, or approximately 10 per cent.

The decline in production when

Kenneth E. Tobin Jr.

1957 is compared with 1956 is reflected in total values. Last year the value of sand and gravel, as compared with 1956, declined from $265,225,544 to $238,781,682, or the same 10 per cent decline experienced in total production. The average value of sand and gravel remained the same as reported in 1956, $1.10 per ton.

As might be expected from the overall decline in production and value from the peak reached in 1956, the reported average production per company and the average production per plant likewise declined slightly in 1957 from 1956 highs. Average production per company in 1956 was 397,012 tons. This average declined in 1957 to 358,382 tons per company, a decline of 38,630 tons per company, or 10 per cent. Similarly, average production per plant declined from 245,944 tons in 1956 to 203,634 tons in 1957. This is a decline of 42,310 tons per plant, or approximately 17 per cent.

Table 2 is an analysis of the methods of transportation employed by the sand and gravel industry for shipping its product in 1957. Included for purposes of comparison are data from our 1956 survey. The respective percentages of the three types of transportation remained substantially the same as for the previous year. Table 2 indicates a fractional decline in percentage for each of the three transportation methods; there was reflective increase in the unspecified category.

Trucks continued to carry the larger part of sand and gravel tonnage, accounting for 139,909,291 tons, or 68.4 per cent of the reported production. The railroads transported 41,074,199 tons, or 20.1 per cent of the production. Water transportation accounted for 16,481,389 tons of sand and gravel, or 8.1 per cent of the total. We were not advised of the specific breakdown by type of transportation for 6,959,926 tons, or 3.4 per cent of the total.

Table 3 summarizes the consumption of sand and gravel in 1957. The heavy construction industry (industrial buildings, highways, streets, etc.) consumed 87,539,342 tons, or 42.8 per cent of the total. This represents a slight decrease in the percentage consumption by heavy construction from that reported in 1956. The ready-mixed concrete industry was the second largest purchaser of sand and gravel, using 62,217,285 tons, or 30.4 per cent of the reported production. This is approximately the same percentage consumption by ready-mixed concrete as was reported in 1956. Sizable quantities of sand and gravel

were also used for concrete products and railroad ballast. More than 12 per cent of the total production was sold through dealers, and the ultimate consumer is not identified for that tonnage.

California led all states with a reported production of more than 35 million tons, followed by Illinois, Pennsylvania, and Texas, in that order. Ohio led all states in total number of companies reporting with 52, followed by Pennsylvania, California, and New York, in that order.

Table 4 is an analysis of the transportation of sand and gravel production in 1957 by size of company, based on returns from the 564 reporters, plus the 40 member companies whose statistics were otherwise available, for a total of 604. The largest number of companies are in two brackets: 50,000 to 100,000 tons, in which there are 117 companies, responsible for 4 per cent of the total production; 100,000 to 200,000 tons, in which there are 124 companies, responsible for 8.5 per cent of the total production. These are the same two production brackets in which the majority of companies participating in our 1956 survey were classified.

Nine companies reported individual production of more than 3,000,000 tons of sand and gravel last year, accounting for more than 18 per cent of the total production. Conversely, the more than 71 per cent of companies in the smaller brackets produced less than 23 per cent of the total tonnage.

Table 1—Sand and Gravel Output in 1955, 1956, and 1957

	1955	1956	1957
Production:			
Sand (tons)	95,210,450	104,970,811	97,170,144
Gravel (tons)	110,343,428	134,824,523	119,292,294
Total (tons)	205,553,878	239,795,334	216,462,438
Value:			
Sand	$ 90,053,558	$105,080,012	$ 97,678,911
Gravel	125,002,997	160,145,532	141,102,771
Total	215,056,555	265,225,544	238,781,682
Average value per ton:			
Sand	$ .95	$1.00	$1.01
Gravel	1.14	1.19	1.18
Total	1.05	1.10	1.10
Companies surveyed	1,657	1,597	1,463
Companies reporting	565	604	604
Number of plants operated by reporting companies	909	975	1,063
Average production per reporting company (tons)	380,631	397,012	358,382
Average production per reporting plant (tons)	236,586	245,944	203,634

1957 totals include 40 member companies not actually replying to the questionnaire but whose production of 12,037,633 tons of sand and gravel was otherwise available.

Table 2—Methods of Transporting Sand and Gravel in 1956 and 1957

Type of Transportation	1956 Short Tons	1956 Percent of Total	1957 Short Tons	1957 Percent of Total
Truck	151,698,995	68.6	139,909,291	68.4
Rail	44,947,044	20.3	41,074,199	20.1
Water	19,825,103	9.0	16,481,389	8.1
Unspecified	4,737,543	2.1	6,959,926	3.4
Total	221,208,685	100.0	204,424,805	100.0

Table 3—Consumption of Sand and Gravel in 1957

Type of Consumer	1956 Short Tons	1956 Percent of Total	1957 Short Tons	1957 Percent of Total
Construction (buildings, highways, streets, etc.)	97,018,506	43.9	87,539,342	42.8
Ready-mixed concrete	68,493,673	31.0	62,217,285	30.4
Concrete products	9,344,330	4.2	8,485,255	4.2
Railroad ballast	4,538,793	2.0	4,905,648	2.4
Sold through dealers	21,592,023	9.8	24,784,291	12.1
Other	9,495,035	4.3	8,812,552	4.3
Unspecified	10,726,325	4.8	7,680,432	3.8
Total	221,208,685	100.0	204,424,805	100.0

Table 4—Distribution of 1957 Sand and Gravel Production by Size of Company

Size Group (tons)	No. of Companies	No. of Plants	Production (tons)	Percent of Reported Production	Percent of Participating Companies	Percent of Participating Plants	Accumulated Total Production	Percents of Totals Total Companies	Percents of Totals Total Plants
0— 25,000	48	48	688,963	0.3	7.9	4.4	0.3	7.9	4.4
25,000— 50,000	72	82	2,645,737	1.2	11.9	7.7	1.5	19.8	12.1
50,000— 100,000	117	129	8,556,646	4.0	19.4	12.1	5.5	39.2	24.2
100,000— 200,000	124	164	18,304,455	8.5	20.5	15.4	14.0	59.7	39.6
200,000— 300,000	73	108	17,704,876	8.2	12.1	10.2	22.2	71.8	49.8
300,000— 400,000	41	85	14,362,205	6.6	6.8	8.0	28.8	78.6	57.8
400,000— 500,000	23	39	10,052,937	4.6	3.8	3.7	33.4	82.4	61.5
500,000— 600,000	13	23	6,855,652	3.2	2.2	2.2	36.6	84.6	63.7
600,000— 700,000	16	31	10,323,375	4.8	2.6	2.8	41.4	87.2	66.5
700,000— 800,000	14	53	10,435,164	4.8	2.3	5.0	46.2	89.5	71.5
800,000— 900,000	9	19	7,824,132	3.6	1.5	1.8	49.8	91.0	73.3
900,000—1,000,000	7	23	6,602,179	3.1	1.2	2.2	52.9	92.2	75.5
1,000,000—2,000,000	29	136	39,857,511	18.4	4.8	12.8	71.3	97.0	88.3
2,000,000—3,000,000	9	63	21,799,985	10.0	1.5	6.0	81.3	98.5	94.3
3,000,000—5,000,000	6	37	21,252,729	9.8	1.0	3.5	91.1	99.5	97.8
Over 5,000,000	3	23	19,195,892	8.9	0.5	2.2	100.0	100.0	100.0
Total	604	1,063	216,462,438	100.0	100.0	100.0			

This table does include the 40 member companies which did not return our questionnaire, but whose total production of 12,037,633 tons of sand and gravel was otherwise available.

Separate Plants Provide Aggregates, Drain Rock At Swift Dam Project

By HARRY F. UTLEY

ANOTHER ON THE SPOT REPORT

SWIFT DAM, presently under construction in southwestern Washington, is the most important link in a chain of a half-dozen power dams being built by the Pacific Power & Light Company along the Lewis River.

As is often the case, the dam site is in a remote mountain area about 60 miles by road from Vancouver, Wash., and far removed from any established source of specification sand and gravel. The prime contractor, Jones-Tompkins, was therefore faced with the necessity of either setting up his own pit and processing plant, or of subcontracting the job. In this instance, the choice was the latter and the contract went to the J. N. Conley Company of Portland, Oreg.

The Swift project is heralded as the highest rolled-earth dam ever constructed; it will rise 512 ft. from foundation to crest and will contain more than 15,000,000 cu. yd. of materials. Concrete for the spillway and powerhouse will total 80,000 cu. yd. Aggregates for all the concrete, plus 250,000 cu. yd. of special filter or "drain" material, which must be processed almost as carefully as the aggregates, are being produced in separate plants by the Conley organization.

Purpose of the "drain rock," as it is known on the project, is to construct a vertical wall section of this material through the dam on the downstream side of the core, in order to drain away any water which might seep through the relatively impervious core. This will

This view of the Conley setup shows the two processing plants at Swift Dam. The production line for drain rock is at the left; concrete aggregates are processed at the right.

Flumes from the two sizing screens in the aggregate plant (left) carry sand and water to the 8-port sand-classifying machine.

prevent any possible saturation in the downstream shell. The drain rock, consisting of 6-in. crushed material and selected fines, is being placed in a wall 12 ft. thick from crest to base. At the base it connects with a horizontal layer of the same drain material to conduct seepage water downstream beyond the toe of the embankment.

The same river-bed deposit, 2½ miles downstream from the site of the dam, is being excavated for both aggregates and drain rock. Digging is done by a Northwest 80D 3¼-cu. yd. dragline and another excavator of the same type equipped as a 2½-cu. yd. shovel. These units load into Euclid bottom-dump trucks which carry to the separate hoppers of the aggregates and drain-rock processing lines. The two plants are located side by side and are straight-line producers, each capable of turning out about 1,500 cu. yd. per day.

The aggregates plant crushes, washes, and sizes coarse material in three finished sizes—3- to 1½-in.; 1½- to 3¼-in.; and ¾- to ¼-in. Sand is specified in six sizes: 4-, 8-, 16-, 30-, 50- and 100-mesh, with the proportions set up within close limits. A typical F.M. is 2.84. Because of deficiencies in natural-sand sizes, a portion of the finished sand is manufactured, but selective digging in the pit is employed to avoid as much grinding as possible.

The aggregate-plant production line involves a Lippmann apron feeder between the hopper and a 24- by 36-in. Pioneer primary jaw-crusher; a 4- by 8-ft. El Jay scalping screen in circuit with a Telsmith Gyrasphere secondary crusher; two 4- by 12-ft. Symons 2½-deck washing and sizing screens; and a Pioneer roll-crusher to manufacture sand as required from screen oversize or surplus.

Sand passing the screens is painstakingly processed in a 12- by 28-ft. 8-port Telsmith classifier, followed by a 30-in. by 25-ft. twin-screw Telsmith dewaterer.

The classifier, one of the first of this type to operate in the West, accomplishes the eight separations by a combination of gravity and the carrying effect of the water in motion. (For a detailed description of the classifier see *Pit & Quarry Handbook*, 1957 edition, p. B-146).

Sand discharged from the various valves is caught in a two-way collecting flume, one side for "waste," the other for "save." When a sample indicates that the finished sand is outside the specification limits, the plant operator can divert any fraction to waste and thus correct the gradation.

The drain-rock plant is simpler in layout and involves no precise processing of fines except that anything finer than No. 10 mesh is wasted. Sizing is done by a 6- by 14-ft. Simplicity triple-deck vibrating screen. Oversize is reduced by a 30- by 42-in. Pioneer jaw-crusher and a 36-in. Traylor gyratory machine.

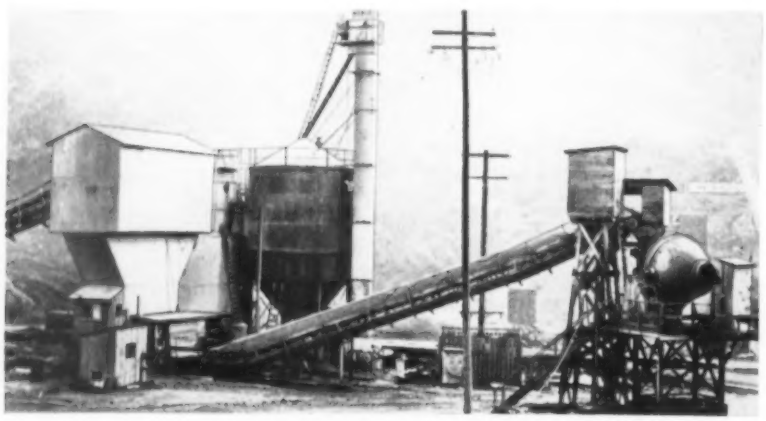
Production and stockpiling of the drain rock was started early in the autumn of 1956. Aggregate processing did not get under way in volume, however, until the spring of 1957.

Available space for the concrete plant and aggregate storage on the river bank was at a premium; so a Noble-Mobile complete portable plant on wheels was driven to the site. This setup solved the space problem and effected a considerable saving in cost.

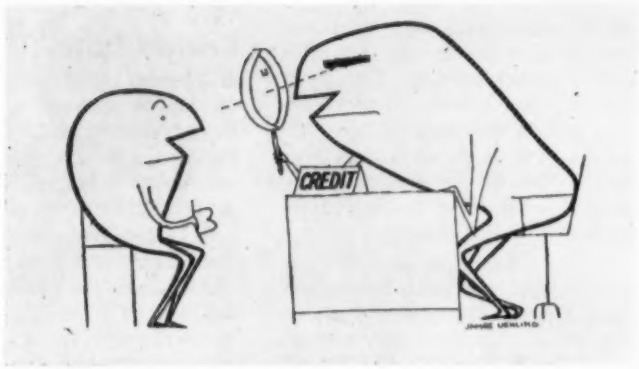
The Noble-Mobile batches and delivers to a Smith 112-S tilting mixer by covered belt-conveyor.

(*Continued on page* 190)

Another view of the two plants shows the conveyor structures between the crushers and the screen of the drain-rock plant.



The concrete plant setup, with the portable batch plant delivering to the tilting mixer, which charges the trucks. Aggregates arrive via the conveyor at the extreme left.



Call it what you will—rolling adjustment or recession—the nation's economy has hit a snag. Costs are up; sales are down; and the business failure rate is rising. Bankers are giving loan applications a thorough screening . . .

Have You Checked Your Credit Rating Lately?

WITHIN the next few months many thousands of businessmen, caught short by the tightening profit margin squeeze, are going to sit down with their bankers to discuss the possibility of a short-term loan. Many of these requests for emergency operating capital will be turned down.

Is there anything you can do to improve your credit standing at a time when all lenders will be taking a sharp look at loan applications? Is there any way you can be sure of needed financing when bankers are refusing other businessmen?

Yes, there is. The first step is to understand how your banker goes about sizing you up as a credit risk.

Like many other businessmen, you may know your banker personally. He may hold a mortgage on your home or he may have lent you money to buy the family car. Even so, you may not know how he judges you financially when you need extra cash in your business.

When you are trying to decide whether you should request a loan, remember that banks are in business to lend money. They want to give you credit—*providing there is a reasonable assurance that the loan will be repaid.* But bankers do not take heavy risks. They must protect the depositors whose money you want to borrow.

A business loan is made in the belief that it will help the borrower increase the earnings of his business so that the loan can be repaid. The banker, therefore, is interested in your sales and in seeing how the credit he extends will help to boost them. If the loan is sizable, your banker will probably require a great deal of information—personal references, balance sheets, income statements, and historical details of your business organization.

This information will be sifted and studied to see how you stack up against five different tests—the so-called Five C's.

Character — Your banker will want to know whether you are a dependable businessman and reputable citizen in the community. Too, he will check the information supplied by your references and your record of repayment of previous loans.

Capacity—You may be sure that your capacity for achievement as a businessman will be carefully evaluated. If you don't pass these personal tests, the other three C's make little difference.

Capital comes next. Inexperienced businessmen often expect the bank to provide the lion's share of their financial backing. You probably will not get very far with your loan application unless you are willing to back your own confidence with a personal investment in reasonable proportion to your existing and proposed debt.

Collateral, bankers say, does not make a bad loan good, but it may make a good loan better. Banks do not like to foreclose; they are less interested in the price your inventory, real estate, or other assets might bring in a forced sale than they are in your normal ability to repay.

Conditions refer to the influence of business trends in general and the tightness or easiness of credit. Of course, your banker will know a great deal about the economic climate of your community and will be interested in your prospects in relation to it .

Supplying the basic information about your business history should not be difficult. In small towns bankers sometimes know local businessmen so well they can fix their credit limits without seeing a loan application. But the larger the town or the bigger the loan, the more details you will be expected to give; and at this point the banker may require complete, accurate, and dependable financial statements.

On a new loan you may be asked for statements covering past years, as well as the current period. While most businessmen can provide a balance sheet of some sort, they are likely to have trouble when asked to supply income statements, sometimes called profit and loss statements. The balance sheet tells your banker approximately what your business is worth, your working capital position, and related data. Your income statement adds information about your sales, margin of profit, earnings and trend of your financial activities.

It goes without saying that providing authoritative financial statements and answering questions about them can prove difficult without professional accounting advice. Bankers are not impressed when businessmen give them information in round numbers or from memory. They want financial data in writing and in language they can understand—which means in accordance with accounting principles that other businessmen use and endorse.

That's where a certified public accountant comes in, and as one banker puts it: "A borrower can save a lot of time and get off on the right foot with us if he can refer us to his C.P.A."

Bankers know that certified public accountants are professionally bound to high standards of conduct and competence. For example, under a recent addition to the professional accountant's code of ethics, a banker is assured that statements signed by a C.P.A. will contain either an unqualified or qualified opinion or will disclaim an opinion entirely as to the fairness of your financial condition. There can be no burying facts, because if a C.P.A. withholds his opinion, he must explain why he has done so.

For unsecured loans of $10,000 or more the tendency in banking circles today is to require an audit by a C.P.A. Take your accountant with you when you go to the bank to discuss the loan. Then, if an audit is necessary, you, your banker and your accountant can agree on the information to be submitted.

Beware of attempting to restrict the *scope* of an audit. The audit is made so that the C.P.A. can express an opinion on your financial statements. If you limit the extent of his investigation, he may be forced to disclaim an opinion on the fairness of your statements. Bankers prefer to receive "clean certificates," those which the C.P.A. has certified with no qualifications. In many cases he cannot do this unless he is permitted to observe inventories and confirm accounts receivable.

Bankers know that the majority of business failures—and bad loan risks—occur because people fail to keep adequate financial records and install business-like accounting systems. It eases a creditor's mind to know that an accountant will be advising the businessman on cost controls and telling him how to avoid unnecessary scraps with the tax collector—another factor which bears on your credit standing.

When a banker analyzes your financial statements, he is assessing your economic health. Note the significant ratios or standards which he uses—and which you can calculate yourself—to determine your chances of getting a bank loan.

A seemingly unnecessary piece of advice to any borrower is to cooperate with his bank. Yet many applicants will give information grudgingly or throw hurdles in the banker's way. There is no reason to withhold information on which the bank depends for a decision on your loan. At best, this attitude will only delay your loan; at worst, it will cause you to lose it altogether.

Critical Ratios

- *Current ratio* — current assets divided by current liabilities; this should usually be at least two to one, but special circumstances are sometimes considered.
- *Quick assets to current debt* — cash, receivables, and other ready cash items divided by current debt; one to one is the rule of thumb, but this, too, is flexible.
- *Debt to capital*—money owed to creditors, compared to the owner's money in the business; the lower the ratio, the better.
- *Fixed assets to capital*—real estate, buildings, and fixtures divided by net assets; the ratio should be kept as low as possible to avoid depleting working capital.
- *Inventory to working capital* — shows percentage of working capital tied up in inventory; an abnormally high ratio may result in a shortage of liquid working capital to meet other expenses.

Standard Fire Brick Co. Becomes A.P. Green Division

The proposed merger of The Standard Fire Brick Company, Pueblo, Colo., into the A.P. Green Fire Brick Company, Mexico, Mo., was approved recently. William S. Lowe, president of the latter concern, announced that the merger was effective May 1, 1958. The Pueblo firm will become a division of A.P. Green Fire Brick.

John MacFarlane, former president of Standard Fire Brick, will serve as general manager of the new division. No other changes are contemplated on the Standard staff.

Factors of Dust Suppression In Small to Medium Size Rotary Kiln Systems

By **WOLF G. BAUER**
Consulting Engineer

PART II

ESCAPE DUST

In Part I of this discussion series we examined the "primary dust suppression phase" in the kiln system, namely the sources and suppression techniques of dust *within* the system. In the present article let us evaluate the pertinent factors associated with that portion of the dust which escapes the kiln and collection system.

What Constitutes Dust Nuisance? In qualifying the meaning of the word "nuisance," it is necessary to know exactly what properties or conditions of the dust are objectionable or in question. Thus it may be the particle size, the color, the toxic property, its abrasiveness, its chemical nature and effects, the difficulty or ease with which it adheres or can be cleaned from surfaces, or perhaps its irritating effects on the respiratory system. Any one of these may be sufficient reason to bring on complaints.

The simplest and sometimes the most prevalent case of dust nuisance is the one involving a complaint motivated by esthetic reasons only. Thus light-colored dust coatings on parked cars, on surrounding green vegetation, or on house surfaces may require frequent washings. These complaints about dust nuisance may originate in a small geographic area forming the predominant flow-shadow section of the exhaust gas stream. They may originate from very few people at frequent intervals, or they may come to the plant operator's attention infrequently but from widely scattered points. An analysis of the problem takes into consideration the several contributing factors of weather, topography, population density in any direction, zoning boundaries, and future expansion of suburbs or industry. The operator should familiarize himself with all aspects of this problem before spending his dust-suppression dollar. The time of day in which dust is seen or experienced by complainants, for instance, may point to a solution in mild cases. One of the writer's clients had drying operations at his plant shifted to night-time hours only, and all complaints disappeared literally "over night."

Escape Dust Deposition The direction, distance, and area the escape dust will take and cover obviously depends on several factors such as height of emission point above the ground, wind direction and velocity, surrounding topography, dust fineness, amount of condensable steam, air stratification, air temperature and inversion conditions.

The operator's control extends only to stack height and dust fineness; he is at the mercy of weather conditions for the rest. Thus, in the original selection of the plant site there is an opportunity to minimize future complaints and dust collection costs by taking into consideration prevailing winds, topography, and planned urban or industrial expansion.

In still air dust will be deposited close to the plant or point of emission, the particles falling at a distance related to their size and settling velocities. However, air is seldom still, and particles of 10-microns size and under will be airborne as long as the carrying turbulent air does not impinge directly on surfaces or the ground. It is therefore apparent that while dust elimination limits may be met by the plant, certain weather conditions can conspire to load up the neighboring air cumulatively until the nuisance value threshold is overstepped. There are then only two remaining alternatives, cessation of dust-producing operations during such conditions, or employment of high-cost, high-efficiency collection devices. While the practice is not general, it would seem logical that for some smaller plants, and under special conditions, the part-time use of higher-efficiency collection devices could well be considered for operation during adverse weather only in view of the high power costs involved.

Height of Dust Emission Point Most kilns used to operate with natural draft from tall hot stacks. The advent of dust-collecting equipment with its additional draft losses required stack draft to be augmented with exhaust fans discharging into these stacks. Stacks now may be lower and designed primarily to carry escape gas and dust

to such elevations that the emission products are well dispersed and thinned out before they contact neighboring surfaces and areas.

Stack height varies greatly, and there are many plants where fans at ground level discharge to atmosphere without such stacks. However, stacks are helpful in keeping + 50-micron particles from settling within the plant area, and they also allow the gases to clear any high plant structure. Thus, stack height is related to surrounding plant machinery or working area elevations. In some cases stacks were even made to pierce through prevalent inversion layer heights, especially in the presence of objectionable fumes. With the advent of power draft, stack dimensions may be made considerably smaller than when draft power came from the stack only.

EVALUATION OF DUST EMISSION ORDINANCES

Inequitable Basis of Restricting Dust Emission Many of the existing air pollution laws and restrictions had their bases in the smoke abatement ordinances from boiler and coal burning plants. One of the most frequently quoted specifications is that based on the 1949 A.S.M.E. Smoke Regulation Ordinance, which states that dust in the exhaust gases must not exceed 0.85 lb./1000 lb. of gas escaping to the atmosphere. In some ordinances this is based on 50 percent excess air operation. Often it was conceded that this did not require a dust collection efficiency of over 85 per cent, although such efficiency is rather academic, in view of the fact that it depends on the particle size gradation and range of the dust entering the collectors. In some instances, such as the 1950 ordinances of New York, coarse particle size limitation was exacted, as for example a requirement that not more than $\frac{0.40}{0.85}$ lb./1,000 lb. of gas could exceed 325-mesh size.

Of 72 municipal ordinances on which dust loading requirements are available, 32 provided quantitative specifications in units of weight of dust in grains or pounds per weight or volume of stack gases emitted. This range varied widely between 0.30 to 0.75 gr./c.f. and 1 to 2.5 lb./1,000 lb. of gas.

Here, then, we come to the first fallacy and confused basis of establishing dust emission limits, namely the use of a ratio of dust weight to gas volume. (7,000 grains = 1 lb.). If two plants, for example, operated side by side, each required to limit its exhaust gas dust concentration to such specifications, each may require a dust suppression system of the same efficiency. If one plant were five times as large as the other, however, it would also emit and deposit on the neighborhood five times as much dust from its stack as the other. Obviously, the small plant is unduly penalized in equipment and operating cost per ton of product or dust collected although it is responsible for only one-sixth of the dust emitted from the two operations.

One plant for instance, due to its product values may have to process five times the quantity of raw material that another one would in order to show the same total earnings. With equal earnings but handling different quantities of materials and gases, neither operation should be favored in the total amount of dust it is allowed to emit to the surrounding community or countryside.

Another example of this kind might be an operation in which the raw material contains very large proportions of volatile ingredients. The latter show up in the exhaust gases upon which dust concentration ratios may be based. For instance, in comparing a shale calcining process with a lime-burning operation, it will be found that due to the higher fuel requirements and CO_2 gas evolution in the case of the lime plant, three times as much exhaust gas is emitted per ton of raw material input as in the case of the shale plant.

Attempt at More Equitable Ordinances Although some planning commissions and municipal, county, or state legislators have little knowledge that such inequities do exist, it should be pointed out that industries are themselves to blame for not helping in the formulation of such ordinances. However, there are signs that some ordinances do recognize, at least in part, some of the discrepancies remaining in restrictions based on dust concentration only.

Some states, such as California, have tried to take the plant size factor into account, and have equated the dust emission limits not to stack dust concentration, but to a rate curve based on plant input tonnage, including fuel weight. This is a fair and encouraging beginning, although it still exacts penalties if the above mentioned volatile percentages in the raw material (including large quantities of moisture up to 60 percent) change relative size, power,

(*Continued on page* 190)

Comparisons of Dust Emission Limits (Based on Kiln Processing Plants Using Average Amounts of Fuel and Types of Raw Material)

Material Input T.P.D.	Municipal-Codes Minimum lb./hr.	Municipal-Codes Maximum lb./hr.	A.S.M.E. Code lb./hr.	California AP Code lb./hr.	California AP Code % of Input	Collected Dust vs. Efficiency Based on A.S.M.E. Code 85% (Dry Coll.) lb./hr.	Collected Dust vs. Efficiency Based on A.S.M.E. Code 97% (Wet Coll.) lb./hr.
12	2.0	6.5	1.7	2.8	0.28	9.6	55
24	4.0	13.0	3.4	4.8	0.21	19.2	110
36	6.0	19.5	5.1	5.1	0.17	28.8	165
48	8.0	26.0	6.8	6.0	0.15	38.4	220
60	10.0	32.5	8.5	6.7	0.13	48.0	275
120	20.0	65.0	17.0	10.0	0.10	96.0	550
180	30.0	97.5	25.5	13.1	0.09	144.0	825
240	40.0	130.0	34.0	16.2	0.08	192.0	1100
720+	120.0	390.0	102.0	40.0	0.06	576.0	3300

Rigid laboratory control, full automation featured in Newest American Rock Wool Plant

By BUREN C. HEROD

OUTSTANDING in its design and operations, the new Corsicana, Tex., plant of American Rock Wool Corporation, latest in the company's chain of seven mineral wool production units, presents an impressive picture of modern technology in the processing of nonmetallic materials.

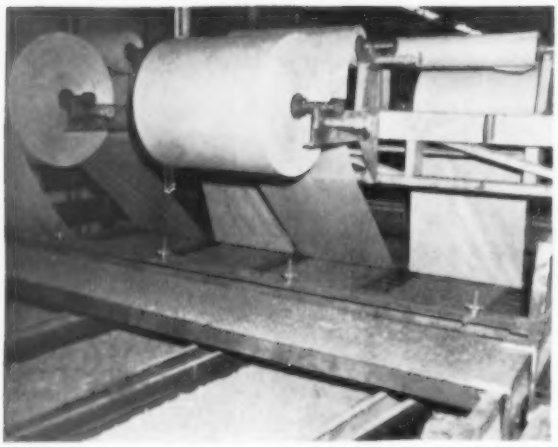
While it is not the largest single production unit in the organization, the new plant is the most modern and has a capacity of more than 20,000 board feet of batts per hour, in four thicknesses, as well as a simultaneous hourly output of more than 1½ tons of granulated material. Other company plants are located at Birmingham, Ala., Torrance, Calif., Wabash, Ind., Red Wing, Minn., South Plainfield, N. J. (see PIT & QUARRY, Feb., 1957, p. 71), and Tacoma, Wash.

Evidence of the comprehensive engineering involved in the new plant is seen in the fact that the operation is fully automated. No hand touches the raw or in-process materials from the time they are received in railroad cars until the finished product leaves the production line. In addition, the facility, which now incorporates one each of batt and granular material production lines, was designed to accommodate the installation of another set of those lines when future markets warrant.

The firm's own central engineering staff, headquartered in Wabash,

Raw materials are received by rail and brought into the plant at Corsicana, Tex., with this system.

Design and development of the fully-automatic Corsicana plant was carried out by American Rock Wool engineers.



After leaving the oven and slitter-saw section, the batts enter this covering and sealing stage of the flow line.

Ind., was responsible for the design and development of this modern plant. Personnel involved include W. T. Tillotsen, vice-president in charge of manufacturing, W. H. Owens, chief engineer, and J. S. Tillman, who supervised construction.

Ground was broken for the project early in 1956. By mid-August, 1956, the equipment was undergoing run-in. During that time, a structure covering 49,000 sq. ft. of floor space—including 22,000 sq. ft. of warehouse area—was built, and equipment was installed.

American Rock Wool's officials selected the Corsicana location for the new facility after a study of the expanding Southwestern building materials markets. Soundness of that study is evident in the plant's marketing area, which includes Texas, Oklahoma, Louisiana, western Mississippi, and western Arkansas, regions which are served by both truck and rail shipments. Markets in New Mexico, southern Colorado, Kansas, and southwest Missouri are served by rail alone. Mileage covered in one week by trucks dispatched from this location has been equivalent to the circumference of the earth.

The Corsicana plant supplies major building material distributors in its marketing area with all standard thicknesses and lengths in batts, and it also fulfills special orders from those distributors. Quality of output is carefully maintained through a laboratory control program in which daily control tests are made on all products at regular intervals. This program is augmented by spot checks. The Corsicana laboratory also runs tests on the products from other company operations for standardization of material and performance quality. Daily control test reports cover such items as weights of raw materials per each cupola charge, cupola operating temperatures and steam pressures, blow chamber and oven temperatures, wool densities, tests of both horizontal and vertical coverage in sq. ft. of finished product, stiffness, resilience, and other physical characteristics.

Located on a spur of the Southern Pacific Railroad, the plant receives its raw materials—coke and iron slag from Daingerfield, and copper slag from El Paso—entirely by rail. As received, the rail gondolas discharge into an under-track hopper from which they are removed by a belt feeder. The latter can deliver the contents of a 60-ton gondola to the plant in 90 minutes.

Near the mid-point of the inclined feed belt is a pair of chutes through which the raw materials may be discharged to outside stockpiles. When transported to the plant, the feed is discharged into a transfer car mounted over a series of storage bins. Two of these are used for iron slag, and one each for coke and copper slag.

Draw from the respective bins is accomplished *via* a short conveyor. An identical installation is provided below each bin. The conveyors discharge into weigh-buckets suspended from scales. Materials are proportioned by weight to give the desired composition in the finished product, and through an interlocked system, the conveyor units supplying the weigh-buckets are stopped when a pre-set weight of a particular material has been reached.

A shuttle car is in turn spotted below the respective weigh-bucket —the latter discharging into the car through air-actuated gates. The shuttle car is then moved to a skip-hoist, where the load is side-dumped into a hoist bucket of 3,000-lb. capacity. A pushbutton control actuated by the shuttle car operator causes the hoist to raise the bucket to the top of a cupola and to return it to loading position automatically when it has been discharged.

At the heart of the process is a pair of foundry-type cupolas which are charged as described above with alternating layers of blended slag and coke. Continuous melting is carried out in these units at a temperature of approximately 3,000 deg. F. Combustion air is provided by compressors, and the flow is regulated by an air weight control.

Molten material flows from the cupola through a slag notch to a spinner, where steam is introduced under pressure to accomplish fiberizing of the mineral wool. Oil, for dust control, and resin, which provides resiliency in the finished product, are also introduced at this point. Process steam is provided by a 400-hp. boiler. Refuse, or unfiberized slag, is dropped from the spinner and base of the cupola to a trough on the floor below, from which it is removed by a conveyor.

As fiberized through the spinner, the mineral wool enters a blow chamber. The latter houses a traveling wire screen on which the wool is collected. This is accomplished by a down draft of air through the top strand of the screen into an underlying windbox. The air is exhausted from the windbox by fans and discharged to atmosphere through a vertical exhaust duct, or stack. Only a very nominal dust load is carried in the exhaust, and the plant interior itself is exceptionally dust-free.

At the discharge end of the blow-chamber is a seal roll which is adjusted to various heights above the screen in accordance with desired

At the discharge point manual operation is involved for the first time in the production line. Batts are folded and transferred to a bagging table.

In the next operation the batts are automatically delivered into the bags, which are placed on pallets, to be carried to the warehouse area.

batt thickness. A control is provided to regulate screen travel speed within a range of 0 to 40 f.p.m.

From the blowchamber screen, the wool may be transferred to a cross conveyor for feed to the granulator system, where the material is broken up and subsequently bagged in bulk. In straight flow, the wool is received from the blowchamber screen on a short conveyor and transferred to a following drying oven.

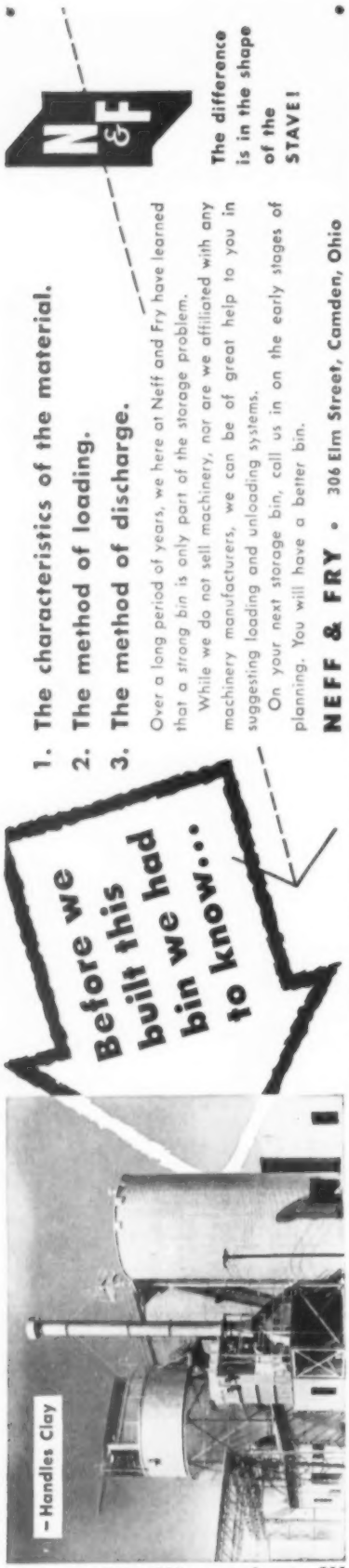
Throughout the drying length of the oven, the mineral wool is subjected to a drying temperature of about 400 deg. F., provided by a gas-fired burner. The upper of two traveling metal mesh screens between which the mineral wool blanket travels is adjustable in height, again in accordance with the various batt thicknesses desired.

As discharged from the oven, the blanket is transferred on a short conveyor to a slitter-saw section, where the full-width blanket is cut into batts of various widths. From the slitter-saw section the strips pass next to the stage where the mineral wool is covered with various types of paper. After this covering and sealing, the strips pass to the final stage to a cut-off saw which moves across the batt and cuts them to desired lengths.

Discharged from the production line onto a takeoff table, the batts are folded by workmen and transferred to an adjacent bagging operation. From the latter, the bags of batts are placed on pallets which

A view of the 22,000-sq. ft. warehouse area, filled with bags of batts.

The covered truck-loading dock, seen here, and a similar rail-loading point are located on opposite sides of the warehouse. Truck and rail shipments reach a nine-state area.


N & F
The difference is in the shape of the STAVE!
1. The characteristics of the material.
2. The method of loading.
3. The method of discharge.
Over a long period of years, we here at Neff and Fry have learned that a strong bin is only part of the storage problem.
While we do not sell machinery, nor are we affiliated with any machinery manufacturers, we can be of great help to you in suggesting loading and unloading systems.
On your next storage bin, call us in on the early stages of planning. You will have a better bin.
NEFF & FRY • 306 Elm Street, Camden, Ohio
Before we built this bin we had to know...
– Handles Clay
Enter 190 on card, page 211

are then removed by fork-lifts to the warehouse area. These lift trucks are also used to remove pallets from the warehouse to the truck-loading dock on one side of the warehouse, and to the rail-loading spur on the opposite.

As indicated earlier, the batts are produced in varying thicknesses, in three widths, and in 2-, 4- and 8-ft. lengths. Off dimensions are also produced in accordance with special distributors' orders.

An unusually clean and well maintained manufacturing facility, the plant is operated around the clock on a 5- to 7-day week depending on market demands.

American Rock Wool's executive and sales offices in Chicago, are headquarters for James R. Addington, president; W. T. Tillotsen, vice-president in charge of manufacturing; C. L. Neumeister, vice-president; G. B. Sudlow, vice-president in charge of sales; and J. P. Cairns, vice-president and assistant to the president. The technical service and central engineering departments are in Wabash, Ind.

Swift Dam Project

(*From page* 182)

The mixer discharges into Dumpcrete trucks; maximum haul is about 3 miles.

Aggregates are delivered to the batch-plant bins by a conveyor which is fed by a front-end loader. Present cement storage capacity of 1,000 bbl. (625 in plant; 375 in ground storage silo) is being increased to 3,000 bbl. with the addition of a second ground silo. Aggregate bin storage capacity in the batch plant is 100 tons.

December, 1958, is the target for completition of the Swift project.

Harold Gross is superintendent in charge of the aggregates and drain-rock production for the J. N. Conley Co. Design, engineering, and management of the dam and powerhouse project is in the hands of the Bechtel Corporation, and E. E. Nichols is serving as project manager.

HARRY G. HINSON, secretary and treasurer of the Bessemer Limestone and Cement Company, died on March 22.

Dust Suppression

(*From page* 186)

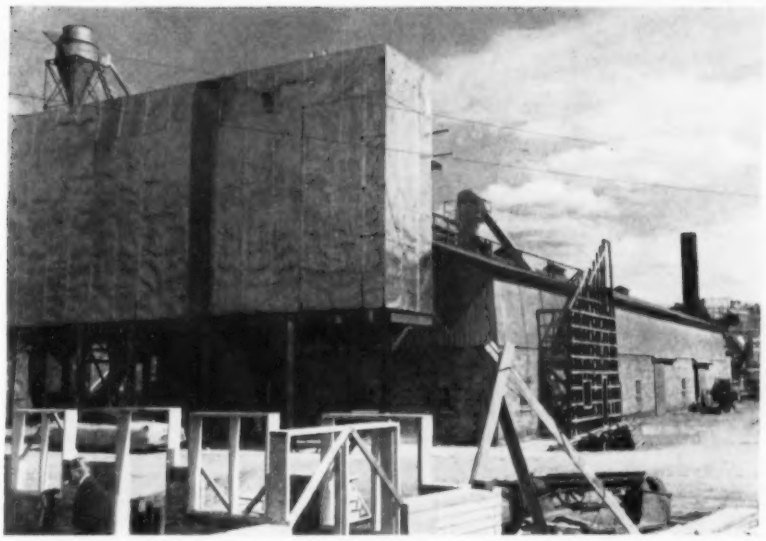
and cost of the increased volume gas-handling and dust-collecting system.

The accompanying table was constructed to show more graphically how, for example, the more equitable code used in California compares with the A.S.M.E. code and the wide range of other municipal ordinances in the amounts of dust allowed to escape into the atmosphere. It is an interesting fact that up to about a 30-t.p.d. plant capacity, the California code parallels the strictest or most limiting of the municipal codes, but then becomes successively stricter with the large plant capacities.

In working out the mean weights of emitted dust based on daily plant capacity or raw materials input, the writer based these values on intermediate in the minerals processing field using rotary kilns. Thus the raw material was assumed to contain not over 20 percent volatile matter including moisture, and the fuel requirements were also intermediate for drying and heat-processing requirements using kilns.

Any legislative planning or air pollution control board or commission contemplating setting aside an area for limited or unlimited industrial use or park development must certainly recognize that under local land and atmospheric conditions the immediate surrounding neighborhood can absorb only a certain maximum weekly or monthly dust deposition rate, irrespective of whether the dust comes from one or two large plants or many small processing operations, and that therefore a dust concentration ratio in any one exhaust stack is not the only criterion for evaluating area-wide dust nuisance. If limits are set on the maximum size of dust particles to be tolerated past a certain perimeter, the small plant with its higher dust suppression cost per ton of material can obtain relief by operating at lower collection efficiency in the finer dust sizes.

PERCY O. UNDERWOOD, president of the Underwood Sand and Gravel Company, Utica, Mich., died recently at the age of 54 years.



General view of Cobo Minerals plant, with packing department and truck loading bins at the left. An office building is under construction (foreground).

Uranium Boom Reason For Building of New Lime Plant

By WALTER E. TRAUFFER

ANOTHER ON THE SPOT REPORT

THE growing demand for process lime caused by the uranium boom in the Blind River and Bancroft areas of northeastern Ontario has caused an expansion of lime production facilities within shipping distance. Included are several new plants, one of which is a small 100-ton per day rotary kiln plant near Coboconk, Ont. This is operated by Cobo Minerals Ltd., one of five companies controlled by J. S. Wheeler Enterprises, which is owned by John S. Wheeler of Toronto.

Although the present plant did not actually go into full operation until August, 1957, it has a history dating back about seven years. In 1952 the Canada Crushed Lime Company started building a plant. When it went into operation in 1953 as Cobo Minerals, Mr. Wheeler, through his Chemical Sales Corporation of Canada, acted as sales agent.

- **small rotary kiln averages 100 tons per day**
- **Unusual setup permits doubling surge pile volume**

For many years the Chemical Sales Corp. has represented the Dalleck Corporation for lime sales in Canada, until recently selling only U. S. lime. As the uranium demands grew, however, it became advisable to obtain a local source of supply. Due to its inability to operate economically, however, this plant was put up for sale. It was purchased in January, 1957, by Mr. Wheeler only because he needed to keep a source of supply.

A complete rebuilding of the plant was begun at once. Produc-

Above: The truck hopper, crusher, and scalping screen are at the right; the screenings pile and main plant feed pile at the left.

Left: The main 30,000-ton surge pile is in a conical excavation in the rock. A conveyor in a tunnel reclaims to the plant.

The 7-ft. 6-in. by 125-ft. rotary kiln, with its reciprocating trough cooler (foreground). At the right is the cyclone for coal mill air.

tion of crushed stone began on July 1, 1957, and the first lime was produced on August 18. In the rebuilding process the conversion from oil to coal burning was a major economy factor. This work was designed by Mr. Wheeler, with the help of John Hughson, general superintendent. Nearly every department of the plant was affected. There is space for a second kiln which is expected to be installed soon.

Then, on October 25, 1957, the plant was seriously damaged by a fire. Rebuilding was begun at once, and the plant went back into operation on April 7, 1958.

Quarry The quarry was originally opened about 100 years ago, and shaft kilns were operated much of the time. The deposit is in the Black River limestone and analyzes 98 to 99 percent $CaCO_3$, and 90 to 95 percent CaO when calcined.

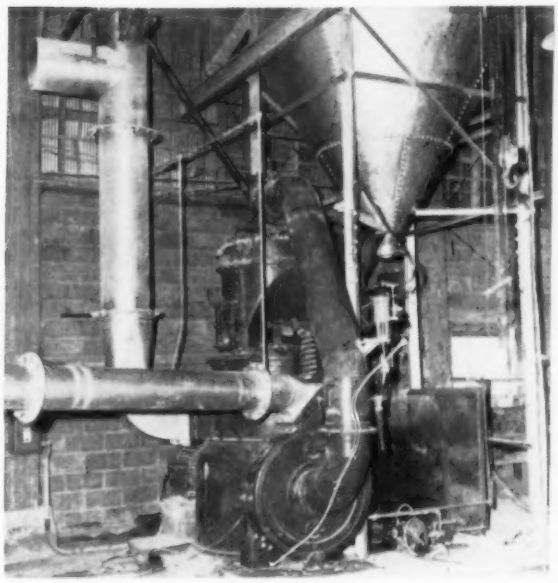
Although the quarry is being worked in three 10-ft. benches, the top level is so broken and weathered that only the two lower benches need to be drilled and blasted. Drilling is done with a Gardner-Denver jackhammer, and Canadian Industries 40 percent Forcite explosive is used. A minor amount of secondary blasting is necessary.

The stone is loaded by a 1-cu. yd. Thew Lorain shovel into two 8-ton dump trucks which haul to the plant. There it is dumped over an 18- by 18-in. grizzly into a 30-cu. yd. hopper. A reciprocating feeder drops the rock through a 17-ft. chute into a Cedarapids No. 2220 impact crusher. A 24-in. by 60-ft. belt conveyor feeds to a 4- by 8-ft. Dillon 2-deck screen with 1¾- and ⅝-in. openings; oversize is returned to the crusher by a conveyor, and minus ⅝-in. undersize is conveyed to a stockpile and sold as screenings. The ⅝- to 1¾-in. rock off the bottom deck of the screen is kiln stone and is carried on an 18-in. by 200-ft. conveyor to a surge pile.

This surge pile is notable because it is in a conical excavation in the rock deposit near the plant and because rock is reclaimed through a tunnel as in a glory-hole or in stope mining operation. This arrangement

was developed by first tunneling into the face of the rock ledge at ground or plant level, the tunnel being 6 by 8 ft. in cross-section and 60 ft. long. A 6- by 6-ft. shaft was stoped up to the surface 30 ft. above at an angle of 45 deg. This opening was then enlarged from the top down by drilling and blasting, and the blasted rock was loaded through this stope into a mine car and hauled away.

The surface opening was enlarged into a cone 75 ft. in dia. at the surface, with about the natural slope of broken stone. The 30,000 tons of rock removed was crushed and sold as crushed stone. The double conical stockpile also has a capacity of 30,000 tons—all live storage.



The direct-firing bowl mill which dries and grinds coal for kiln firing. The kiln burner pipe is at the left.

Kiln Stone is reclaimed from the surge pile by a Syntron feeder onto an 18-in. by 85-ft. tunnel belt. An inclined conveyor feeds to the steel kiln feed hopper. A Syntron feeder discharges through a chute into the 7-ft. 6-in. by 125-ft. Vulcan rotary kiln, which has a slope of ½ in. to the foot and is mounted on four sets of rollers. It is driven by a 50 hp. electric motor through a Reeves variable-speed drive at a speed of 2 r.p.m.

The kiln is lined with A.P. Green 40 and 70 percent alumina brick. A refractory dam 3 ft. from the discharge end gives a soaking effect in the 1,800- to 1,900-deg. F. calcining zone. No ring troubles have as yet been experienced. Kiln output is averaging about 4 t.p.h.

Cooler Calcined lime is discharged from the kiln into a reciprocating cooler of the company's own design. This consists of a 30-in. wide by 38-ft. long trough completely inclosed by a cooling water jacket. Water is provided at the rate of 5,000 g.p.m. and 40 p.s.i through two flexible hose connections. A deep well is the original source, but the hot water goes to a 30,000-gal. water tank for cooling and re-use.

Coal Coal for fuel is discharged from trucks on the ledge alongside the plant. A Trojan front-end loader supplies a 100-ton bin, from which a Syntron feeder feeds a drag chain. A bucket elevator discharges through a chute to the 15-ton mill feed bin. In the chute to the Raymond 312A direct-firing bowl mill a permanent magnet removes iron.

This bowl mill is grinding to 90 percent through 200-mesh. Drying air is drawn from the kiln hood *via* a cyclone, and an automatic damper tempers it. The stainless steel burner pipe has a universal joint, so that the flame direction can be adjusted. West Virginia coal of 14,500 B.t.u. content is used, coming by rail to an Ohio port on Lake Erie, then by boat to Midland or Georgian Bay, and finally by rail to the plant.

Gases Kiln gases are drawn through a dust chamber by the 30,000-c.f.m. kiln draft fan. A damper tempers the air to the fan to about 350 deg. F. and it is exhausted through a 6- by 50-ft. brick-lined steel stack.

Control The plant is controlled from one point. A rheostat controls the feeder to the kiln, which is connected to a d.c. voltmeter, so that if the line voltage drops, adjustments can be made. Lights show whether or not material is being fed.

On the kiln control board a Bailey multi-pointer gauge shows the kiln outdraft and the mill suction and exhaust outlet draft. A Brown-Honeywell recording and controlling thermometer, together with a primary air regulator gauge and feeder speed regulator gauge, control the kiln temperature *via* a Brown-Honeywell Pyr-O-Vane temperature indicator. Calcining zone temperature is held at 1,800 to 1,900 deg. F. If this temperature goes to 2,000 deg. F. an alarm sounds.

The fuel rate is now 8 to 8½ million B.t.u. per ton.

Other The 200-deg. lime from the cooler is carried by an inclosed drag chain conveyor to a 2- by 4-ft. Dillon 3-deck screen. This screens out ½- to 1½-in. pebble lime, which is elevated to a loading bin. Everything over 1½ in. and under ½ in. goes to a Morley No. 4 hammermill, which reduces to 85 percent through 200-mesh.

This product is blown to a cyclone and settles into a bin which can be used for direct truck loading or feed to a single-spout Haver packer. Pebble lime is sold to the paper, uranium, and steel industries. Ground quicklime goes to the gold and uranium industries, and bagged quicklime is used for building. As much of the lime for the uranium fields and elsewhere is shipped by truck, a 70-ton Howe truck scale was installed. It is planned to install a Schaffer continuous hydrator, the product to be used for limesoil stabilization.

NEW! Only BOSTON V-Belts are made with

DACRON
Tensile Members

plus

NEOPRENE with
FIBER-DISPERSED Stock!

The industry's most advanced developments are now standard in the entire Boston Multiple V-Belt line!

DACRON Tensile Members

GREATER STABILITY — Changes in humidity — and the resulting moisture regain — often mean a matching problem with ordinary V-Belts. The moisture regain of DACRON* is low — 0.4% — or 1/20th that of the conventional reinforcing fiber. This means far less time spent in matching, and lower belt inventory too. Because V-Belts reinforced with DACRON are more uniform, each belt carries an equal share of the load.

HIGHER STRENGTH — Stronger belts can withstand more shock loading, need less maintenance. DACRON is approximately 40% stronger than the conventional fiber used in V-Belts.

STRETCH RESISTANCE — V-Belts reinforced with DACRON have low stretch. DACRON is inherently stretch-resistant and the cords are put through a special heat and tensioning process to further minimize stretch. Thus, belts reinforced with DACRON show comparatively little growth — even after many months of continued operation.

*DACRON — DuPont polyester fiber

NEOPRENE with FIBER-DISPERSED Stock

GREATER RESISTANCE to oils, heat, abrasion, chemicals and ozone is provided by Neoprene.

HIGH TRANSVERSE RIGIDITY is provided by the closely-packed, straight-line formation of the fibers in the compression member.

EXCEPTIONAL LONGITUDINAL FLEXIBILITY is provided by the virtually frictionless positioning of fibers.

EXTRA SUPPORT for the tensile members during shock-load impact and during normal operation.

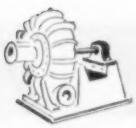
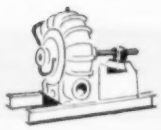
WITH NEW BOSTON MULTIPLE V-BELTS YOU CAN:

- CUT DOWN MAINTENANCE
- MAINTAIN SMALLER INVENTORY
- SAVE MATCHING TIME
- SAVE TAKE-UP TIME

BOSTON

BOSTON WOVEN HOSE & RUBBER COMPANY
DIV. OF AMERICAN BILTRITE RUBBER CO., INC.
BOSTON 3, MASS.

Another Customer Speaks

"most PLEASED WITH EFFICIENCY and EXTREME DURABILITY

—W. S. COWAN, Mgr.
WINNIPEG, MANITOBA

Mr. Cowan and his airplane which he uses to travel back and forth between Winnipeg and Black Island.

SELKIRK SILICA CO. LTD.

PURE SILICA SAND

February 28th, 1958.

Thomas Foundries Incorporated,
P.O. Box 1111,
BIRMINGHAM 1, Alabama.

Gentlemen:

In our new silica sand operation we naturally wanted maximum production and lowest possible maintenance cost. We also wanted the very best equipment available. We therefore bought a Thomas "Durable" Dredge Pump, 8" Discharge, for the difficult job of pumping this silica sand to barges 1,750 feet away. We are extremely glad that we made such a wise selection.

After pumping a complete season with no maintenance whatever and no down time for repairs, your pump has already exceeded our expectations as regards loading time.

We are most pleased with its efficiency and its extreme durability.

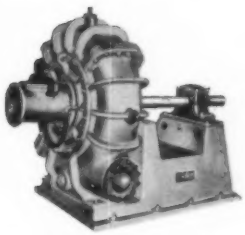
We expect to discuss other pumping operations with your representatives in the near future.

Yours truly,

SELKIRK SILICA CO. LTD.

W.S. Cowan,
Manager.

WSC:mm



THOMAS Durable Dredge Pump

From Black Island on Lake Winnipeg, 80 miles north of Winnipeg, Manitoba, Canada, Mr. Cowan's Company produces a high quality silica sand. A Series HL, 8" discharge, THOMAS Durable Dredge pump conveys the sand from the sump to 1000-ton capacity barges ¼-mile out in the lake, filling a barge in 3 to 4 hours. These loaded barges are towed to Selkirk where the sand is washed, screened, sized and delivered to industrial users.

Read his letter above. Here is another case where the extremely durable and efficient Thomas pump astounds its owners by producing high grade silica sand throughout a full season—TOTALLY WITHOUT COST for maintenance parts and materials and TOTALLY WITHOUT down-time delays for repairs.

This Canadian operation proves again the fact that "You can not buy at any price, a more durable pump for sand and gravel. You can not buy any other pump that will make you as much money."

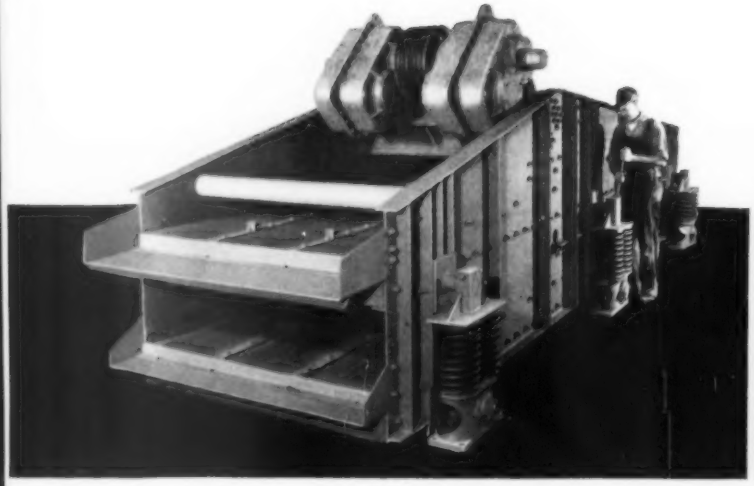
Write for details and free descriptive literature.

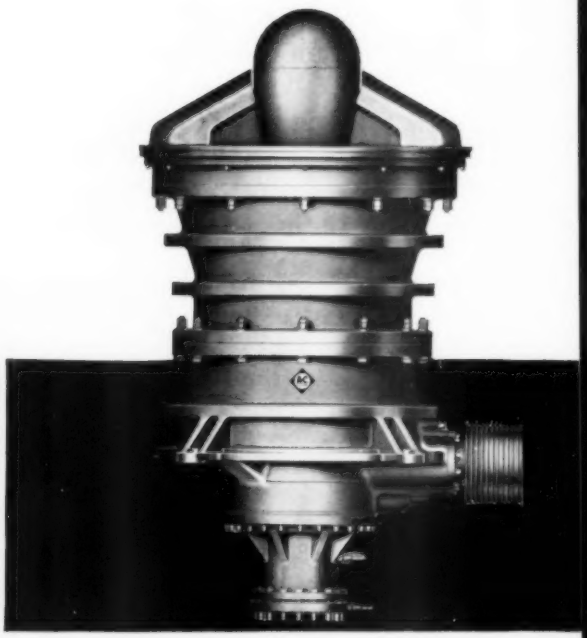
Loading a Selkirk 1000-ton sand barge.

THOMAS FOUNDRIES, *Inc.*

P. O. BOX 1111 . . . . BIRMINGHAM, ALABAMA

The Modern Approach





"Coordineered" Equipment **for the**

Mining and Rock Products Industries

"Work Index" Formula

This bulletin explains the "work index" formula — and how you can evaluate any size reduction operation. Compare efficiency of plants, circuits and machines. It offers the only practical approach for improving performance or determining the right machine for a job. Write for Bulletin 07R7995.

Grinding mills — Whether your process calls for individual mills or a grouped-stage grinding series, Allis-Chalmers can make a right-for-the-job recommendation from seven types of grinding mills.

Vibrating screens — Allis-Chalmers screens are built in single or multiple-deck models for use in scalping, wet or dry sizing, washing, rinsing, dewatering and media recovery.

Gyratory crushers — "One-man, one-minute" product control slashes time required to change crusher settings from hours to seconds. Size adjustment, compensation for mantle wear, and emergency unloading are done at the flip of a switch.

A-C ALLIS CHALMERS

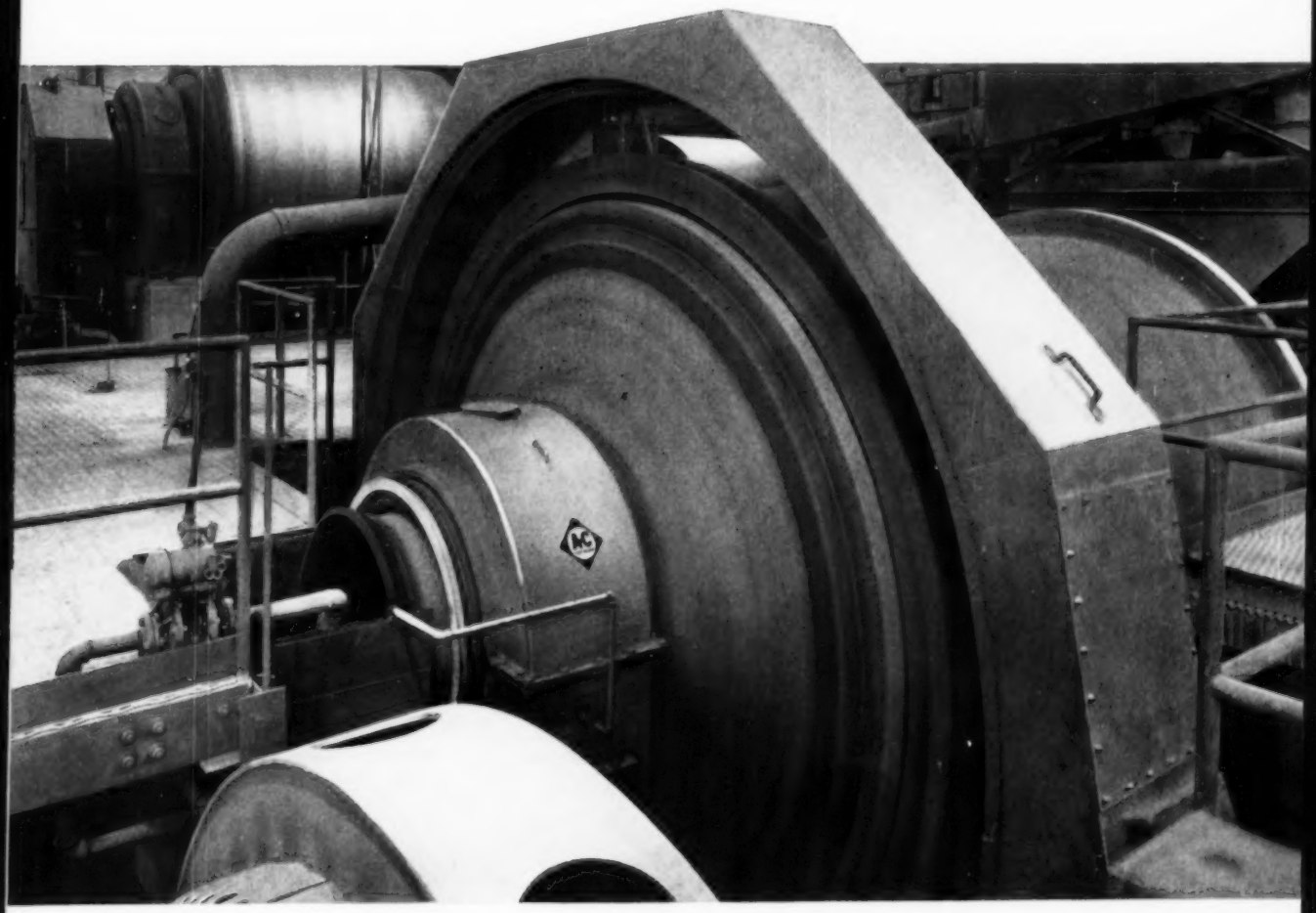
A-5659

to EFFICIENCY!

Practically every type of material mined or quarried is being processed by "Coordineered" equipment from Allis-Chalmers. Coordineering means that product departments work together on a single problem before equipment recommendations are made. Product experts make sure equipment is properly engineered for your specific job — that new units are integrated with both new and existing equipment.

Coordineering draws on Allis-Chalmers unparalleled experience in building and applying industrial equipment. It includes testing in modern laboratory and pilot plant facilities. All to provide profitable processing operations.

Make use of this valuable engineering in the early stages of your expansion or modernization program. An Allis-Chalmers technical team will gladly confer with you or your consultants. Your nearby Allis-Chalmers representative will arrange details. Get in touch with him, or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin.



ALLIS-CHALMERS

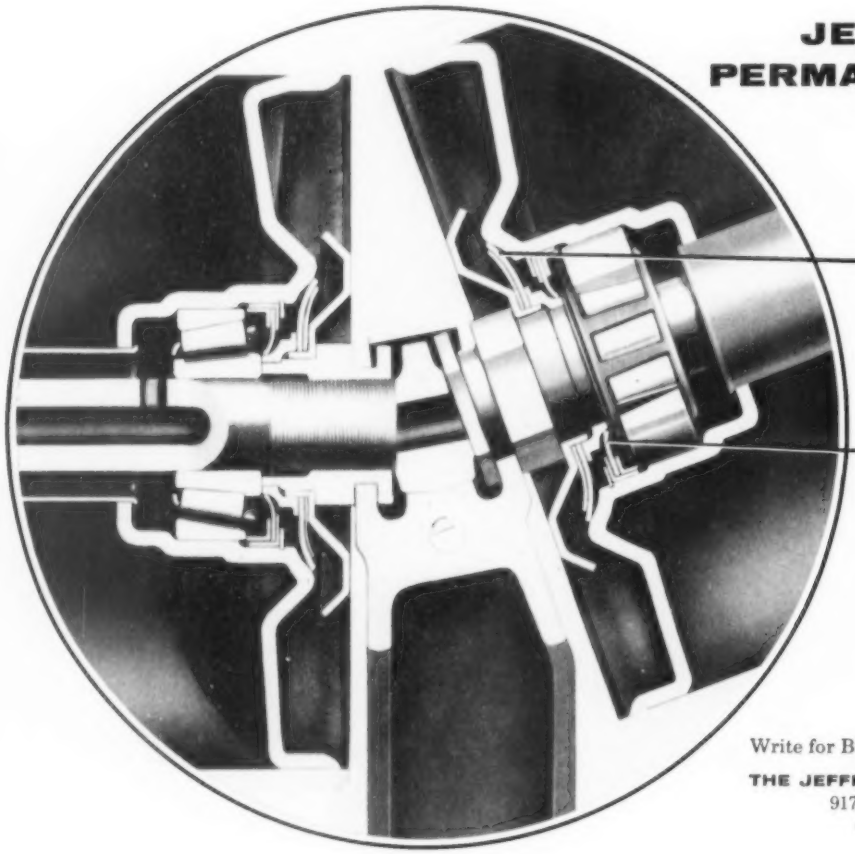
Enter 197 on card, page 211

"One lubrication every two years, more than sufficient"

Just part of the glowing report on the performance of Jeffrey PERMASEAL® Belt Idlers from the superintendent of Pennsylvania Railroad ore docks in Philadelphia. He further stated: "PERMASEAL Idlers have extended greasing periods from months to years." They have been on the job since November, 1953.

New seal construction, efficiently designed roller units, dependability, and long life combined with precision manufacture provide unmatched performance. You'll find Jeffrey idler design superior to anything offered today for belt conveyor service.

JEFFREY PERMASEAL® IDLERS



Magnified view of the heart of the PERMASEAL IDLER—shows double flexible diaphragm seals, bearings, and welded roll ends.

Write for Bulletin No. 925

THE JEFFREY MANUFACTURING CO.
917 North Fourth Street
Columbus 16, Ohio

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT...
TRANSMISSION MACHINERY...CONTRACT MANUFACTURING

for aggregate handling, use

orton

experience

EXPERIENCE means a great deal . . . especially at ORTON where "production-line" manufacture is maintained only so long as the cranes on the line are engineered to the latest, *proved* design for *your* job. For, since Orton can't build *all* the cranes, it builds only the best.

ORTON, *first* with *Torque-Control*, *first* with air-operated controls, *first* to apply new techniques *which have been proved*, is also the *first* to recognize that *each handling job is unique*, thus, an ORTON crane is built for *you*—*your* job—*your* specification.

Consider ORTON first—it *is* first.

EVERY ORTON CRANE has:

. . . ALL power shafts carried on sealed anti-friction bearings—NO exceptions.
. . . ALL motion entirely independent.
. . . NO jaw clutches—not even in travel mechanism.

orton

CRANE AND SHOVEL CO.
608 S. Dearborn Street
CHICAGO 5, ILLINOIS

THE MOST POWERFUL NAME IN CRANES

P&H Diesel Model 687C-18 with Cotta 1.46 to 1 transmission and dual air cleaners at the rear. 50 KW generator, 240 volt—1800 rpm with dust-tight package controls, driven from front end.

P&H DIESEL-ELECTRIC POWER PACKAGE

a compact unit... only 4850 lbs. complete!

With many portable crusher operators switching to electric motors for powering conveyors and auxiliary equipment, P&H has designed the ultimate in a compact, lightweight "power package".

It's the 205 H.P., 6 cylinder P&H Diesel and 50 KW generator. Engine, Cotta Gear, generator and base weigh just 4850 lbs. complete—*up to one half ton lighter than comparable equipment.* The generator, driven directly off the engine crankshaft through a flexible coupling, is a feature of P&H modern design that eliminates belt wear, slippage and maintenance. The P&H Diesel itself has these added advantages:

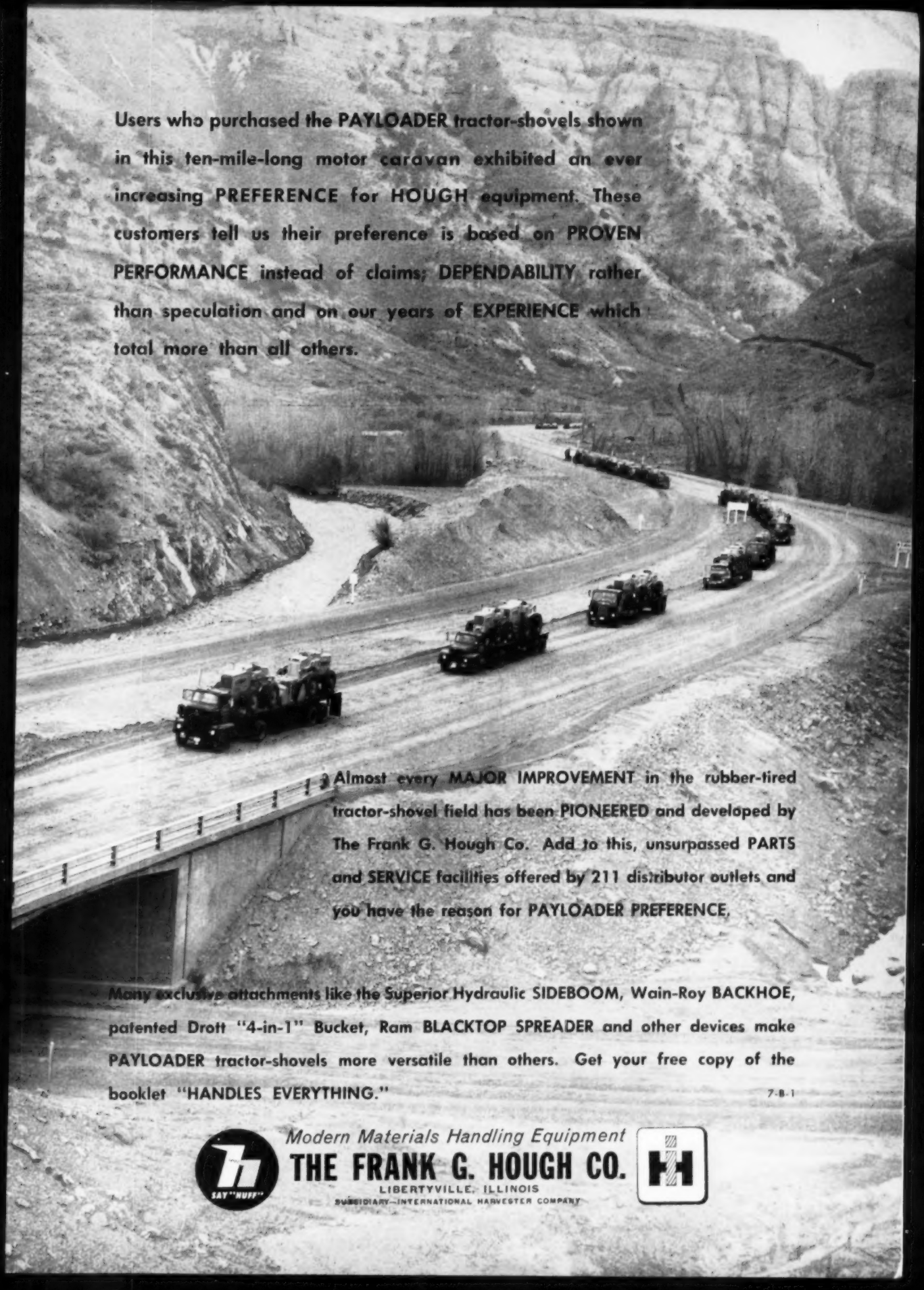
- **More power**
- **Higher torque**
- **Faster starts**
- **Better idling**
- **Big weight savings**
- **Greater fuel economy**
- **25% fewer parts**
- **All wearing parts interchangeable**

P&H Diesel units are also available as direct power and for diesel-electric generators. It will pay you to specify P&H Diesel for your new crusher or your next repowering job. Contact your P&H dealer. Or write, Dept. 420B.

P&H combination power unit and generator set powering a Baldwin-Lima-Hamilton 201E Crusher through a Cotta Reduction Gear and driving a 50 KW generator. Owned by Yoder Asphalt, Inc., Elkhart, Ind. Sold by Korte Bros., Ft. Wayne, Ind.

HARNISCHFEGER

P&H Diesel Engine Division
Crystal Lake, Illinois



Users who purchased the PAYLOADER tractor-shovels shown in this ten-mile-long motor caravan exhibited an ever increasing PREFERENCE for HOUGH equipment. These customers tell us their preference is based on PROVEN PERFORMANCE instead of claims; DEPENDABILITY rather than speculation and on our years of EXPERIENCE which total more than all others.

Almost every MAJOR IMPROVEMENT in the rubber-tired tractor-shovel field has been PIONEERED and developed by The Frank G. Hough Co. Add to this, unsurpassed PARTS and SERVICE facilities offered by 211 distributor outlets and you have the reason for PAYLOADER PREFERENCE.

Many exclusive attachments like the Superior Hydraulic SIDEBOOM, Wain-Roy BACKHOE, patented Drott "4-in-1" Bucket, Ram BLACKTOP SPREADER and other devices make PAYLOADER tractor-shovels more versatile than others. Get your free copy of the booklet "HANDLES EVERYTHING."

7-8-1

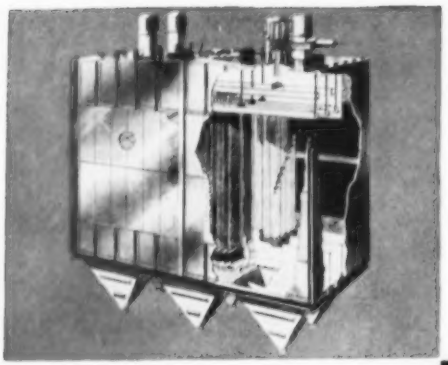
SAY "HUFF"

Modern Materials Handling Equipment

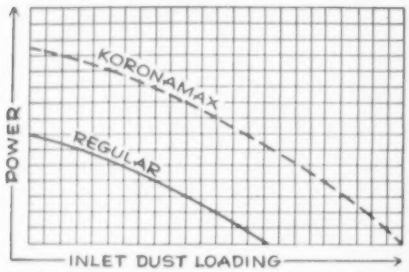
THE FRANK G. HOUGH CO.

LIBERTYVILLE, ILLINOIS

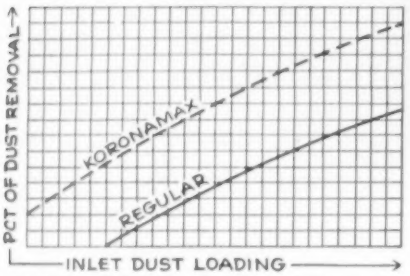
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY



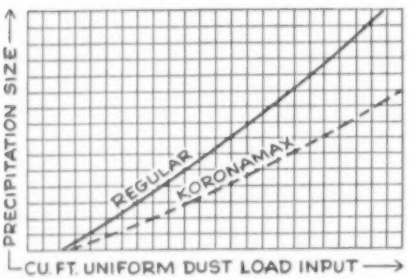
Another Koppers Exclusive in ELECTROSTATIC PRECIPITATION



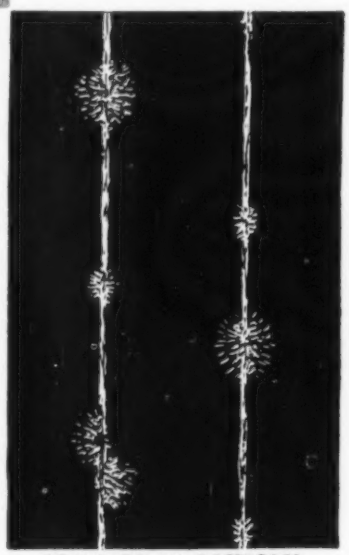
INCREASED POWER— The evenly spaced discharge points of "Koronamax" Electrodes reduce the arc-over tendency and permit increasing power input.



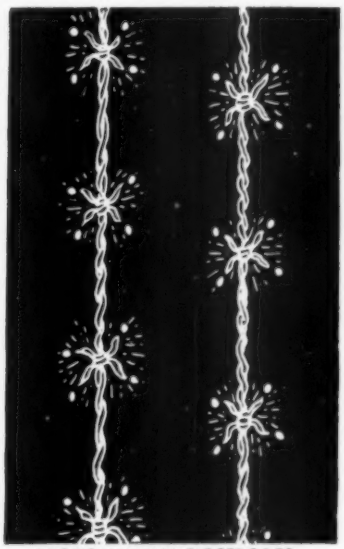
HIGHER EFFICIENCY— Replacement of regular electrodes with "Koronamax" Electrodes allows higher power input — greatly increased efficiency.



SMALLER SIZE— In new installations desired efficiency may be obtained with smaller unit when "Koronamax" Electrodes are used.



CONVENTIONAL ELECTRODES



"KORONAMAX" ELECTRODES

"KORONAMAX" ELECTRODES increase efficiency and capacity of electrostatic precipitators

"Koronamax" Electrodes developed by Koppers are now in service in several different applications and their *controlled* corona discharge has resulted in greatly increased capacity and efficiency. This unique type of precipitator electrode may solve *your* gas cleaning problem.

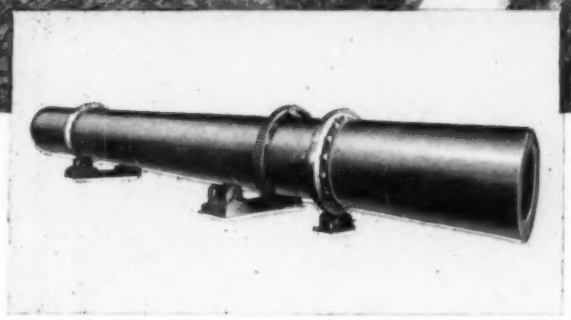
Koppers' experience, constant research and extensive field testing have led to this important advance in precipitator design. Check with Koppers to see if "Koronamax" Electrodes can help you get top precipitator efficiency. For more information, write: KOPPERS COMPANY, INC., 9907 Scott Street, Baltimore 3, Md.

KOPPERS

ELECTROSTATIC PRECIPITATORS

Engineered Products Sold with *Service*

Buildex, Inc., Ottawa, Kansas. Capacity: 600 yd. per day.



GET HIGH QUALITY
Lightweight Aggregate
WITH McNALLY PITTSBURG BUILT PLANTS

McNally Pittsburg Researchers, Designers, and Engineers have made a careful study of the best processing methods and equipment for profitable manufacture and processing of lightweight aggregates.

A vital part of lightweight aggregate plants are the rotary kilns. For increased production, install McNally Pittsburg rotary kilns. These ruggedly built kilns have a low maintenance cost.

For more information write for our Lightweight Aggregate brochure, "Let's Get in a New Business."

COMPLETE PLANTS OR SINGLE UNITS

- ROTARY KILNS
- COOLER
- CONVEYORS
- ROLL CRUSHERS
- JAW CRUSHERS
- VIBRATORS
- CLAY DISINTEGRATORS
- CLINKER BREAKERS
- HOISTS
- RECIPROCATING FEEDERS
- APRON FEEDERS
- MATERIAL HANDLING EQUIPMENT

McNALLY PITTSBURG MFG. CORP.
DESIGNERS AND BUILDERS OF EQUIPMENT FOR BASIC INDUSTRY

GET THIS FREE BROCHURE AND SPECIAL INFORMATION

McNally Pittsburg Mfg. Corp., Dept. P
Pittsburg, Kansas

Gentlemen:

Please send brochure on Lightweight Aggregate plants. ☐

Desired capacity of plant per day is_____.

Shale ☐ Clay ☐

Name_____ Title_____

Company_____

City and State_____

BILL'S IN A SIZZLE

an ordinary tire "blew" the job

but BOB'S ON SCHEDULE with

U.S. ROYAL SAFETY 1st TRUCK TIRES

service-proved against job delays!

Here's a fact proved at strip mines, sandpits, quarries and construction projects by the hundreds. The best way to prevent costly tire delays and keep hauls *on schedule* is to use U. S. Royal Off-Road Tires!

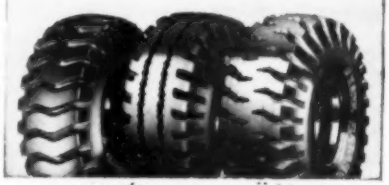
Here's why. First: today's U. S. Royals give you exclusive, advanced features that pay off in extra traction, greater strength and longer wear. Second: these great new tires are backed up with on-the-spot know-your-stuff *service*—including complete and expert *retreading*.

Find out exactly how easily and quickly *you* can cut job delays with these service-proved tires. Call your U. S. Royal Dealer. Or better still—specify "U. S. Royal" on your next new equipment!

U.S. ROYAL CON-TRAK-TOR®—for rugged operations where utmost traction's required

U. S. ROYAL Super FLEETMASTER—for severe service on all your off-the-road trucks

U.S. ROYAL FLEETMASTER®—Dual Purpose, Nylon—top pull *and* mileage on *and* off road



U. S. ROYAL NYLON TIRES ARE TOUGHER, STRONGER, SAFER.

United States Rubber

Rockefeller Center, New York 20, N. Y.

In Canada: Dominion Rubber Co., Ltd.

Fuller . . . headquarters for

Feeders

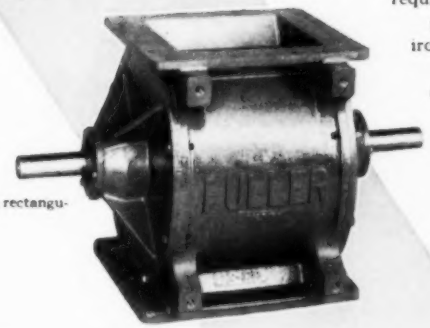
Fuller Roll Feeder for volumetric accuracy, without pulsations.

When your problem is one of feeding dry, pulverized or granular materials, why not come direct to headquarters—FULLER—designers and builders of various feeders for many uses. We have built thousands of feeders for the process industry, year in and year out, for over a quarter of a century. Many have been of special types to meet individual requirements.

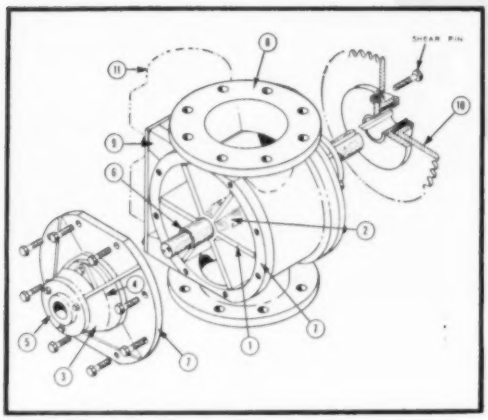
Standard feeders are built of cast iron or combinations of iron and steel. When required, they can be built of special alloys.

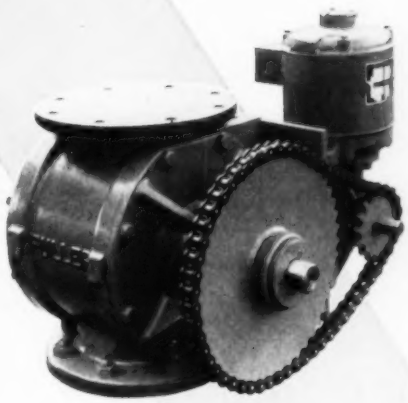
The Fuller Roll Feeder is especially adaptable to handling of dry, pulverized materials with volumetric accuracy, without pulsations. Vane type feeders are built for use where extreme volumetric accuracy is not particularly essential. They are built with stuffing boxes and ball bearings, for vacuum, low pressure, and general purpose uses, with circular or rectangular flanges.

For complete information write for Bulletin F-5.



Vane type feeder with rectangular flanges.





Vane type feeder with circular flanges. Rigid drive for minimum space requirements. Eliminates drive stress between feeder and related equipment.

Description of drawing above:

1. Six vanes. Two vanes seal between inlet and outlet.
2. Tapered rotor hub. Reduces friction from trapped material between rotor and headplates.
3. Integral-cast bearing brackets insure concentric bearing centers with male-female joint between headplate and feeder body.
4. Bearing brackets on sides of packing glands allow free drop of packing gland leakage; prevents material from entering bearings.
5. Integral-shielded ball bearings; factory greased for life of bearing.
6. Shouldered shaft for externally centering and maintaining alignment of rotor, resulting in equal rotor end clearances and eliminating contact between rotor and headplates.
7. Heavy body walls and headplates. Rigid construction to permit smallest possible rotor clearances. Permits at least one possible remachining after normal wear.
8. Standard companion flange size and bolt circle permits connection to pipe size flanges.
9. Integral cast lugs for drive provides universal mounting for any type motor reducer. Rigid drive for minimum space requirements. Eliminates drive stress between feeder and related equipment.
10. Shear pin coupling with simple standard bolt shear pin.
11. Gear motor with right angle combination drive. Can be furnished with a parallel shaft drive if desired.

FULLER COMPANY GENERAL AMERICAN TRADE MARK

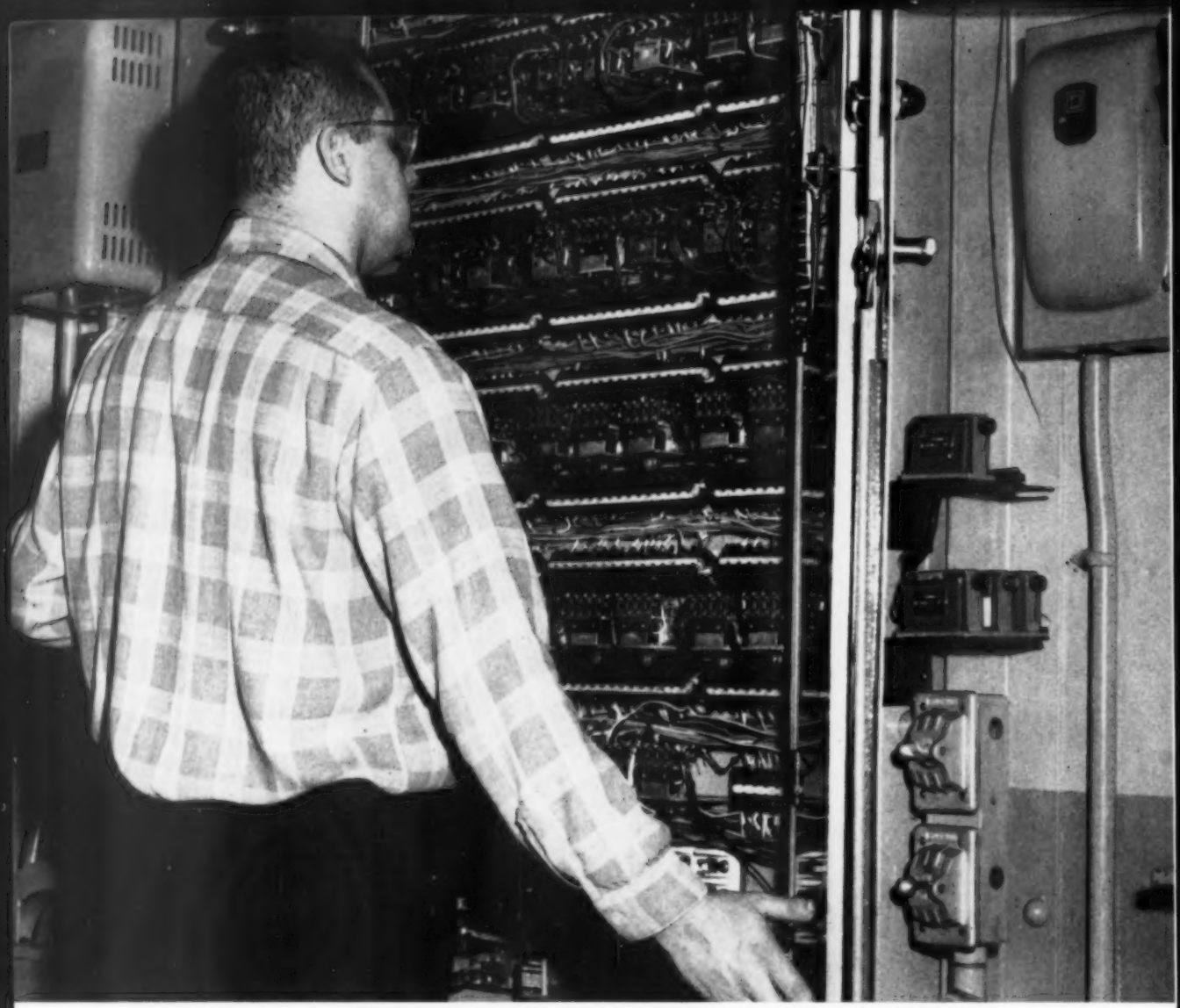
FULLER COMPANY

100 Bridge St., Catasauqua, Pa.

SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION

Chicago · San Francisco · Los Angeles · Seattle · Kansas City · Birmingham

F-16—3047



BEHIND THE SCENES at the new electronically controlled, fully automatic factory for making Du Pont Electric Blasting Caps (both regular and delay).

Automatic loading and electronic controls give you Du Pont Electric Blasting Caps that are even more reliable, more uniform than before

Let us take you behind the scenes at the world's most modern blasting cap plant. Then, you'll see why Du Pont Electric Blasting Caps, both regular and delay, are years ahead in reliability, uniformity and dependability.

Any possibility of human error has been completely erased from this scene. Every step in the process, from automatically loading the shell (and inspecting it 3 times during loading alone), to applying the shielded shunt and paper band is controlled electronically.

This revolutionary approach means that every Du Pont electric blasting cap—regular or delay—*must* meet our rigid standards at *every step* or it will be automatically rejected by one of the dozens of electronically controlled "watchmen."

This elimination of the human equation means that all Du Pont Electric Blasting Caps are even more uniform, more reliable, more dependable than ever before.

And you get all these benefits at NO INCREASE IN COST. Call your Du Pont representative or write to E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware.

DU PONT BLASTING CAPS

DU PONT *Products of Du Pont Research*

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

TOMORROWS BULLDOZER—TODAY!

"THE BULLDOZER OF THE FUTURE" this is the way one Road Dept. official described the Eimco 105 when he saw it operate on competitive tractor tests. Here, once again, the Eimco 105 Dozer has demonstrated superiority over conventional type tractors. In job after job, the 105 consistently proves that its simplicity of operation, smooth power flow, visibility, maneuverability and reduction in operator fatigue is the difference between marginal production and profitable production.

The work site consisted of a steep incline with rock outcropping in big slabs. The bottom ends of the rocks were deeply embedded and required maximum tractor effort to remove them.

Bulldozing down the slopes, the torque converter drive of the 105 enabled it to pick up a capacity load and move down the slope ahead of the competitive tractors with their outmoded conventional type drives.

Throughout the test — straight bulldozing, removing rocks and maneuvering — the 105 managed everything that came its way and did it with the least amount of operator effort. In direct contrast, the competitive tractor operators were constantly clutching, changing gears and braking to accomplish their tasks.

Eimco's Unidrive constant mesh transmission gives variable speed independent track control without clutching and shifting. Let us demonstrate this tractor.

THE EIMCO CORPORATION

Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City

New York, N.Y. Chicago, Ill. San Francisco, Calif. El Paso, Tex. Birmingham, Ala. Duluth, Minn. Pittsburgh, Pa. Seattle, Wash.
Cleveland, Ohio London, England Gateshead, England Paris, France Milan, Italy Johannesburg, South Africa

B 330

← Enter 206 on card, page 211

Do you get service like this?

USS Rolled Plate Lining mills 1,000,000 tons of gold-bearing ore before being replaced

HOMESTAKE MINING COMPANY, Lead, South Dakota, grinds gold-bearing quartz, two-thirds of the ore being of unusually hard rock. The ball mill produces a grind to pass 65% through 200 mesh.

Recently, the #2 unit in the ball mill was relined and performance of the previous 26-month-old USS Rolled Plate Lining was evaluated. The heavy lining consisted of 24 tons of 3″ plate and 5″ lift bars. It was in operation 773.75 days and milled 1,051,034 tons of ore, an average of 1,358 tons per operating day.

Because USS Rolled Plate Linings are made of *rolled* steel, they have superior toughness. Lift bars are rolled alloy steel and heat treated to obtain extra hardness and toughness through the lift portion of the lining. Both plates and bars are made to close tolerances for snug fit.

Our technical personnel will be glad to advise on any tough grinding problem.

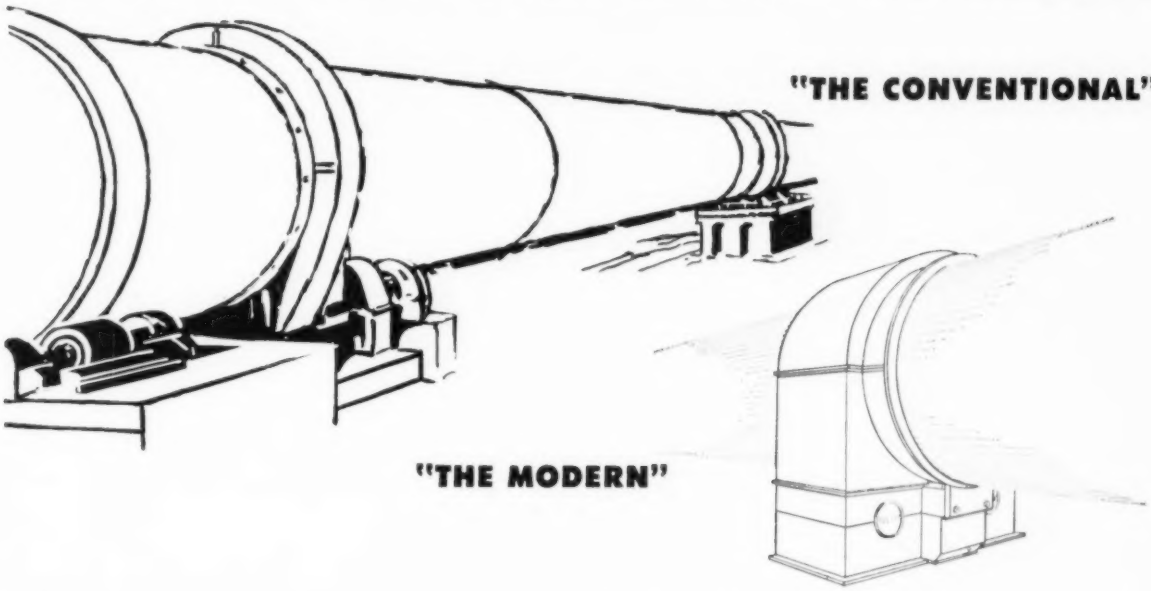
Original lift was 2⅛″. Lift remaining at replacement measures a full 2″. Liner plates are worn to less than ¼″ in the valleys. There was no evidence of breakage in either plates or bars.

United States Steel Corporation – Pittsburgh
Columbia-Geneva Steel – San Francisco
Tennessee Coal & Iron – Fairfield, Alabama
United States Steel Export Company

USS TRADEMARK

United States Steel

WHAT KIND OF A KILN DO YOU NEED?



VULCAN of WILKES-BARRE WILL DESIGN & MANUFACTURE ANY TYPE • FOR ANY APPLICATION

CEMENT (WET-DRY) . . . COKE . . . LIME . . .
CALCINED DOLOMITE . . . PIGMENTS . . .
NODULIZING . . . AGGLOMERATING . . . SINTERING

Plus Kilns for many other related chemical and metallurgical processes. VULCAN: the oldest name in Rotary Kilns, is ready to take care of your every need. Top-flight engineers are constantly searching for new developments in this field. This is reflected by recent patent applications evolving the "New Concept in Rotary Kilns". Always highest quality material fabricated in a modern plant by skilled craftsmen . . . Every department co-ordinated for fast follow-through.

VULCAN designs, engineers, and manufactures Rotary Kilns . . . and items listed below. If you need a Rotary Kiln that is unusual in size . . . type . . . application . . . contact the "kiln specialists" . . . Contact VULCAN of Wilkes-Barre. Write or call today. Estimates, constructive suggestions and preliminary drawings will be furnished (as far as possible) without obligation.

ANY INFORMATION ON ITEMS LISTED BELOW WILL BE SENT YOU IMMEDIATELY.

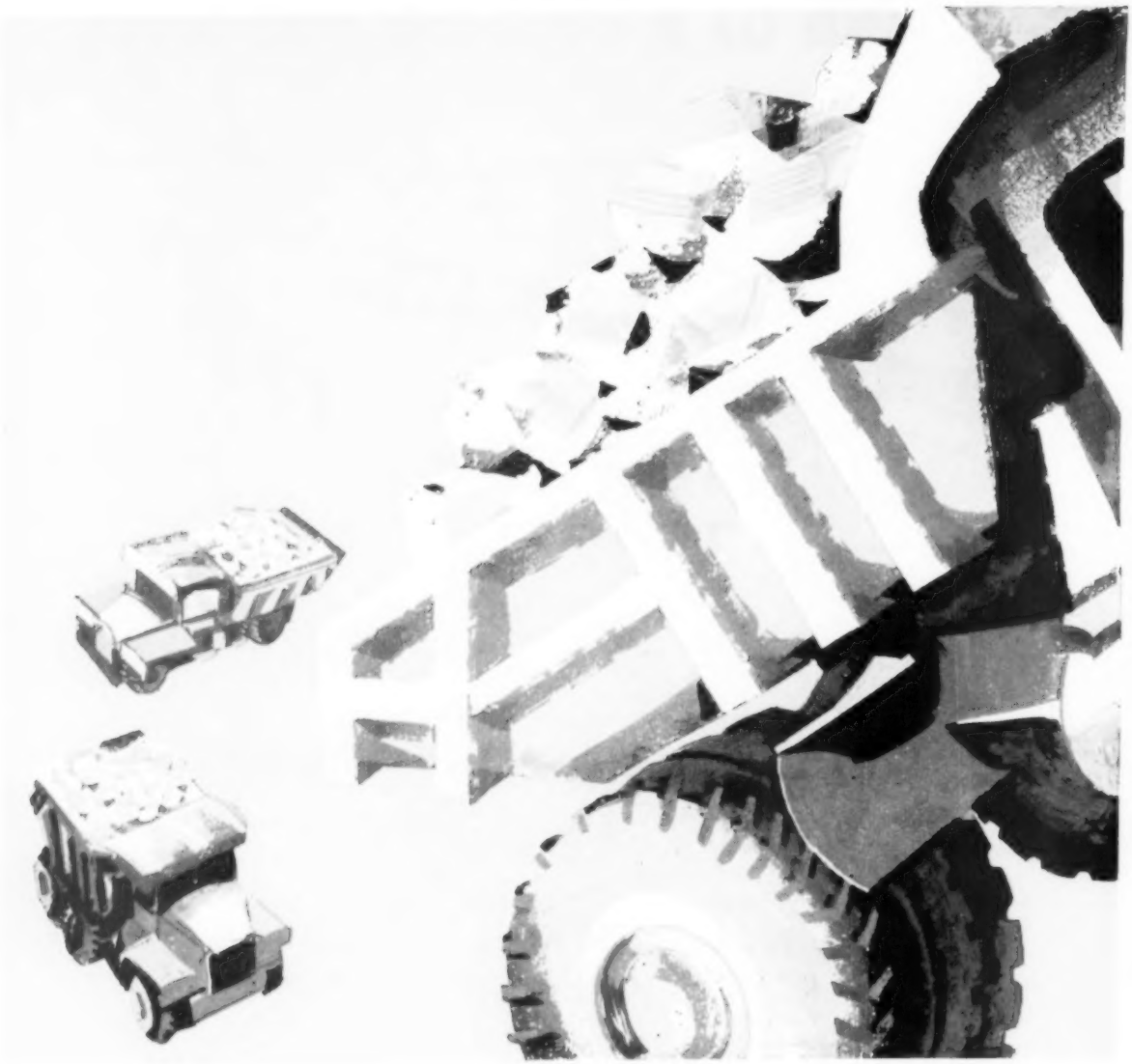
Rotary Kilns, Coolers • Improved Vertical Lime Kilns • Cast Steel Sheaves, Gears
Rotary Dryers • Automatic Quick Lime Hydrators • Steel Plate Fabrications
Rotary Retorts, Calciners, etc. • Briquetting Equipment • Heavy Duty Sugar Mills

VULCAN IRON WORKS

WILKES-BARRE PENNSYLVANIA

"THE OLDEST NAME IN ROTARY KILNS"

ESTABLISHED 1849 • CABLE ADDRESS: VULWORKS



HOW CYANAMID EXPLOSIVES HELP YOU MINIMIZE HANDLING COSTS!

Loading...hauling...and crushing costs can be considerably reduced when you use the RIGHT Cyanamid Explosive. Rock broken into sizes that can be easily and efficiently handled helps you save time and money at every step of your materials handling operation!

Besides a complete line of high-quality explosives, Cyanamid offers you expert technical assistance in achieving maximum efficiency blasting. Delivery direct from our national network of plants and magazines.

For more complete information, call your Cyanamid Representative or write to

CYANAMID

AMERICAN CYANAMID COMPANY
Explosives and Mining Chemicals Department
30 Rockefeller Plaza, New York 20, New York

DISTRICT SALES OFFICES: St. Louis, Missouri • New York City, New York • Latrobe, Pennsylvania • Pott-ville, Pennsylvania • Scranton, Pennsylvania Dallas, Texas • Salt Lake City, Utah • Bluefield, West Virginia. **THE CYANAMID LINE:** High Explosives • Permissibles • Seismograph Explosives Blasting Agents • Blasting Powder • Blasting Caps • Electric Blasting Caps • Blasting Accessories

More Information, Please

Use the prepaid postcard to get this literature or additional details about new equipment and products reported elsewhere in this issue.

THE BAUER MOTORIZED HEAD PULLEY, a single unit conveyor drive which incorporates the motor, gears, and all moving parts within the head pulley drum, is described in literature available from the *Georg von Opel Corporation,* American representative for the West German-made product. **(301)**

A NEW SLING HANDBOOK available from the *Union Wire Rope Corporation* covers more than 80 subjects on Tuffy slings and fittings. Included is new reference information condensed into chart form on sling types, dimensions, and rated loads. **(302)**

THE MECKUM SAND AND GRAVEL JIG, designed for capacities up to 60 t.p.h., is featured in Bulletin No. 800, published by *Meckum Engineering, Inc.* Included are installation photos and a discussion of its design, installation, and operation. **(303)**

SURE-FLEX COUPLINGS are featured in a revised bulletin from the *T. B. Wood's Sons Company.* The bulletin covers additions to the Sure-Flex line, which now includes 10 sizes. Selection data and other engineering tables have been revised to include these large and small coupling sizes. **(304)**

A DUST COLLECTION SYSTEM recently installed to collect nearly 5 t.p.h. of dust is described in a bulletin issued by *The Buell Engineering Company, Inc.* Text includes information on c.f.m. handled, efficiencies, collector layout and arrangement, electric precipitator operation, etc. **(305)**

THE JETAPOWER LINE OF ELECTRIC GENERATING PLANTS is described in an illustrative brochure released by the *Power Equipment Division, Jeta Metal Fabricators, Inc.* **(306)**

ALUMINUM DIESEL TRUCK ENGINES, offering weight savings of up to 690 lb., are detailed in a brochure released by the *Detroit Diesel Engine Division, General Motors Corporation.* **(307)**

KRAFTSMAN CLUPAK PAPER, an extensible kraft paper with greater toughness which permits the use of less total weight for sacks and bags, is described by the *West Virginia Pulp and Paper Company* in a new booklet. **(308)**

GREZALL PI, a special purpose lubricating grease which is insoluble in chlorinated solvents, petroleum hydrocarbons, and other solvents, is featured in literature offered by the *Tower Oil Company.* **(309)**

GRINDING BALLS manufactured by the *United States Steel Corporation* are treated in a booklet covering composition and heat treatment, engineering data, and graphs showing typical hardness curves. **(310)**

FIRST CLASS
PERMIT NO. 44
CHICAGO, ILL.

BUSINESS REPLY CARD
No Postage Stamp Necessary if mailed in the United States

—POSTAGE WILL BE PAID BY—

Pit and Quarry Publications
431 South Dearborn Street
CHICAGO 5, ILL., U.S.A.

July ***PIT AND QUARRY*** **1958**

Insert key numbers found below items on advertising, literature, and new equipment pages. Print company name if not keyed.

VOID AFTER 60 DAYS

_____ _____ _____ _____ _____ _____

_____ _____ _____ _____ _____ _____

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

We Produce _____

More Information, Please

Use the prepaid postcard to get this literature or additional details about new equipment and products reported elsewhere in this issue.

THE AIR TUMBLER, a wet dynamic dust collector which separates the dust from the air by centrifugal action while the water wets and entraps the dust, is detailed in Bulletin No. 581 issued by the *Dust Suppression & Engineering Company.* **(311)**

LIMBEROPE ROPE BELT CONVEYORS are detailed in literature available from the *Joy Manufacturing Company.* Included are steel wire rope specifications, spacing data, and a description of features. **(312)**

GRAVIMETRIC FEEDERS for liquids or solids are the subject of a bulletin issued by *Omega Machine Company, division of B-I-F Industries, Inc.* The bulletin provides explanatory text, dimensional drawings and tables, photographs, schematic drawings, and performance charts. **(313)**

THE USE OF HIGH ALLOY CASTINGS in cement mill equipment is discussed in a new reprint from the *Alloy Casting Institute.* According to the article, critical components must use high alloy castings for long life and minimum maintenance downtime. **(314)**

DUCTILE IRON PIPE FITTINGS are covered in a new catalog available from *The Kuhns Brothers Company.* Catalog 2-PF includes types and sizes of the "K" line of ductile iron fittings, typical applications, and safety factors. **(315)**

ACCO SLING CHAINS manufactured by the *American Chain Division, American Chain & Cable Company,* have been described in catalog DH-105, which includes ordering information, safety factors to consider when ordering, specifications, care, tables of wear, and inspection procedures. **(316)**

BIN-DICATOR MODELS made by the *Bin-Dicator Company* for bulk material, level indication and control are featured in a consolidated catalog including photos, cutaways and schematic drawings, dimensions, specifications, and applications. **(317)**

CRUSHING ROLLS are manufactured by the *Traylor Engineering & Manufacturing Company* in three types—these types are illustrated with detailed specifications indicating the sizes and capacities and other pertinent data in Bulletin 6637. **(318)**

MODEL 404 TROJAN TRACTOR SHOVEL, a four-wheel-drive unit with a 4 cu. yd. capacity, is detailed on a specification sheet released by *The Yale & Towne Manufacturing Company.* **(319)**

SLY DYNACLONE CEMENT COOLING SYSTEMS, as an integral part of the grinding operation, brings a constant stream of air into the separator to cool both the fines and the tailings continuously. *W. W. Sly Manufacturing Company* has issued Bulletin 103, describing the system. **(320)**

July ***PIT AND QUARRY*** **1958**

Insert key numbers found below items on advertising, literature, and new equipment pages. Print company name if not keyed.

VOID AFTER 60 DAYS

_____ _____ _____ _____ _____ _____

_____ _____ _____ _____ _____ _____

Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

We Produce_____

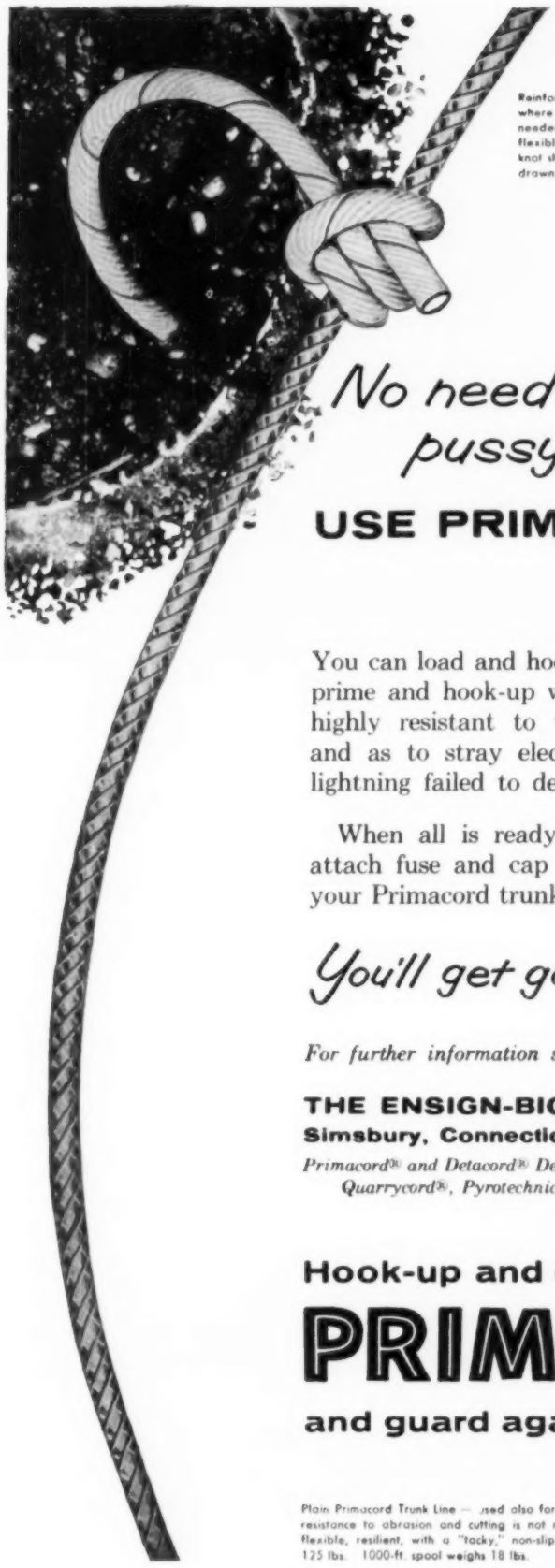
FIRST CLASS
PERMIT NO. 44
CHICAGO, ILL.

BUSINESS REPLY CARD
No Postage Stamp Necessary if mailed in the United States

—POSTAGE WILL BE PAID BY—

Pit and Quarry Publications

431 South Dearborn Street
CHICAGO 5, ILL., U.S.A.



Reinforced Primacord Branch Line — recommended for deep holes where normal strength and resistance to abrasion and cutting are needed. Textile reinforced (yellow with red thread), tough, resilient, flexible. Tensile strength 160 lbs. 1000-ft spool weighs 19 lbs. The knot shown is the double-wrap half hitch, made in the branch line and drawn tightly around the trunk line.

No need to pussyfoot...

USE PRIMACORD

You can load and hook-up *well ahead* of the blast when you prime and hook-up with Primacord detonating fuse. It is highly resistant to vibration, friction, impact, sparks — and as to stray electrical currents, even a direct hit by lightning failed to detonate Primacord.

When all is ready for the blast — then and then only attach fuse and cap or electric blasting cap to the end of your Primacord trunk line.

You'll get good digging

For further information see your explosives supplier or write to

THE ENSIGN-BICKFORD COMPANY
Simsbury, Connecticut • Since 1836

Primacord® and Detacord® Detonating Fuse, Safety Fuse, Ignitacord®, Quarrycord®, Pyrotechnical Devices and Blasting Accessories

Hook-up and detonate with

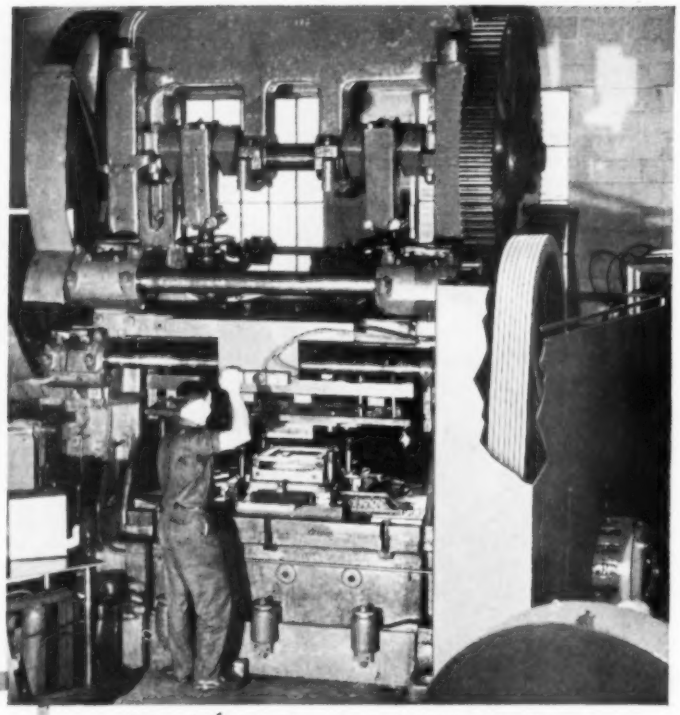
PRIMACORD®

and guard against *Stray Current* hazards

Plain Primacord Trunk Line — used also for shallow holes — wherever resistance to abrasion and cutting is not required. Textile covered, flexible, resilient, with a "tacky," non-slip surface. Tensile strength 125 lbs. 1000-ft. spool weighs 18 lbs.

P-c

Shock loads no problem for Super V-Belts on punch press



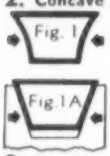
Severe shock loads, which caused standard V-belts to fail, were no problem for Gates Super Vulco Ropes on this punch press.

No other V-belt has ALL these advantages

1. Flex-Weave Cover (U. S. Pat. 2519590)

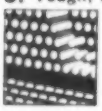
A Gates exclusive: provides greater flexibility . . . prolongs belt life . . . helps deliver more power to driven machine.

2. Concave Sidewalls (U. S. Pat. 1813698)



Note the concave sides shown in Fig. 1. As belt bends, concave sides become straight, making uniform contact with sheave goove (Fig. 1-A). Even contact means uniform wear . . . far longer belt life.

3. Tough, resilient Tensile Cords



Super strong and resilient; provide 40% greater horsepower capacity . . . easily absorb heavy shock loads . . . reduce number of belts required, save weight and space.

4. High Electrical Conductivity

Built into Gates Super Vulco Ropes for safer drives (in explosive atmosphere).

5. Oil, Heat, Weather Resistant

Made with special rubber compounds, Super Vulco Ropes stand up longer under all conditions.

TPA 315

Gates

World's Largest Maker of V-Belts

Especially designed to handle the heaviest shock loads, Gates Super Vulco Ropes solve tough drive problems — reduce both maintenance and replacement costs.

For example: Mr. Daniel Rusinow, president of the R & D Manufacturing Co., Detroit, Michigan, needed to improve efficiency in a 250-ton punch press. The press was originally driven by flat belts, but these slipped and proved unsatisfactory.

Mr. Rusinow first replaced the flat belt drive with standard V-belts, but the severe shock loads of the punch operation caused the belts to fail.

A superior shock-absorbing drive was needed — the local Gates Field Engineer was consulted, and Super Vulco Ropes recommended for the job.

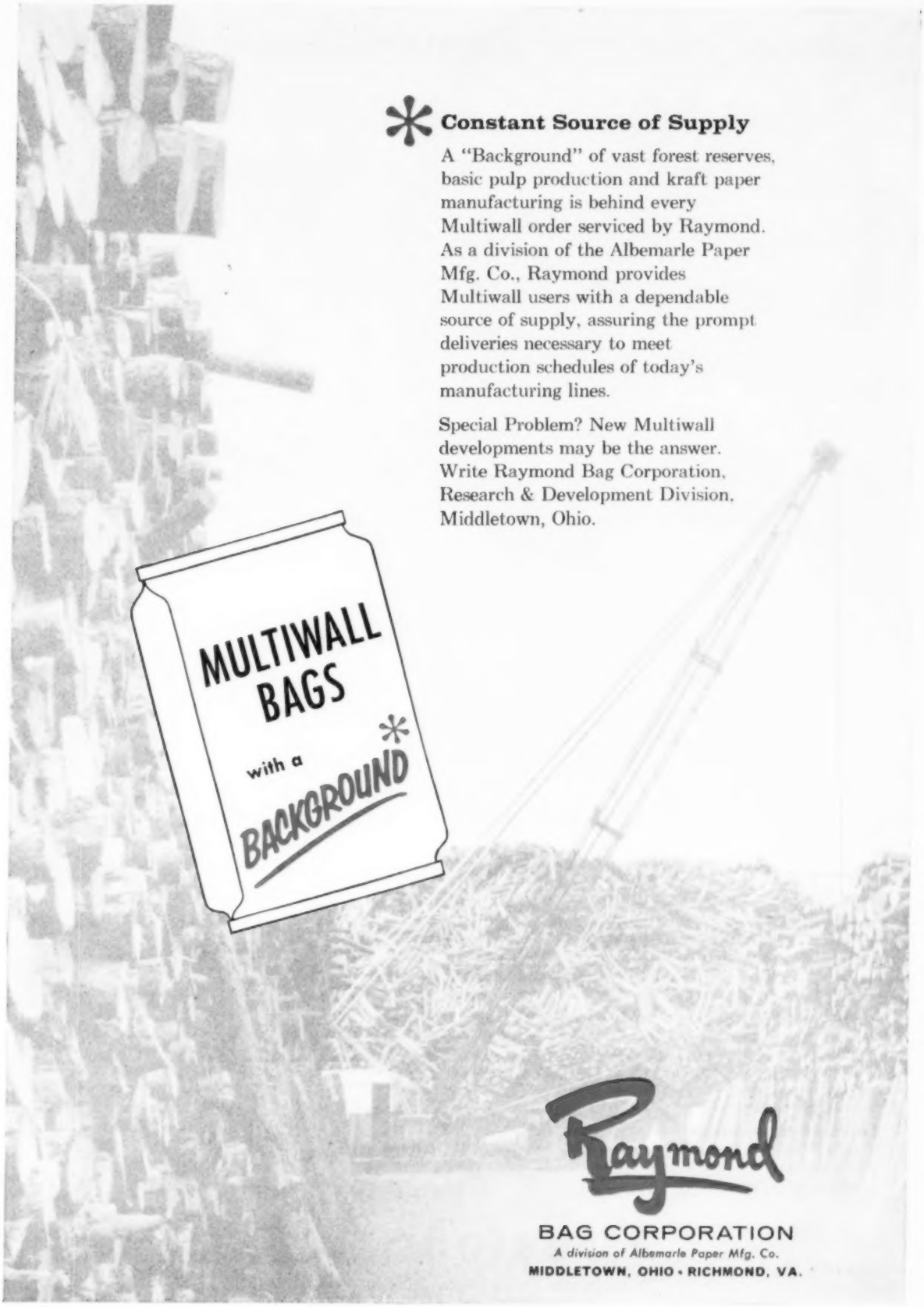
Mr. Rusinow commented, "After our experience with other V-belts, I did not believe it possible to design such an excellent drive, but Gates engineering service and Super V-Belts proved the right answer to the problem."

● **Drive data and design assistance are quickly available to you. Simply call your nearby Gates distributor. Gates V-Belt stocks are carried in all major industrial centers.**

The Gates Rubber Company
Denver, Colorado

Gates Super VULCO ROPE Drives

40% more Horsepower Capacity



Constant Source of Supply

A "Background" of vast forest reserves, basic pulp production and kraft paper manufacturing is behind every Multiwall order serviced by Raymond. As a division of the Albemarle Paper Mfg. Co., Raymond provides Multiwall users with a dependable source of supply, assuring the prompt deliveries necessary to meet production schedules of today's manufacturing lines.

Special Problem? New Multiwall developments may be the answer. Write Raymond Bag Corporation, Research & Development Division, Middletown, Ohio.

Raymond

BAG CORPORATION

A division of Albemarle Paper Mfg. Co.

MIDDLETOWN, OHIO • RICHMOND, VA.

Firestones deliver lowest cost-per-hour service!

From the New York Thruway to Montana's Hungry Horse Dam, contractors using Firestone off-the-highway tires are making new records for long hours of tire service and slashing tire maintenance costs. One big reason is new Firestone Rubber-X—the longest wearing rubber ever used in construction equipment tires.

Another reason is because the combination of Firestone Rubber-X with exclusive Firestone S/F (Shock-Fortified) nylon cord body gives you the strongest, most serviceable off-the-highway tire built today—a tire that beats downtime resulting from rapid wear, cuts, snags and impact breaks—a tire that keeps your equipment rolling on the toughest haul or on the tightest schedule.

See your Firestone Dealer or Store and ask the Firestone Tire Expert how Firestone *tubeless* or *tubed* nylon off-the-highway tires can cut your tire costs. When you order new off-the-highway equipment, always specify Firestone tires.

FIRESTONE ON-THE-JOB SERVICE — Unmatched Firestone off-the-highway tire service cuts costs, keeps equipment rolling to keep all jobs on schedule.

TUBELESS OR TUBED
ROCK GRIP WIDE BASE® ROCK GRIP®

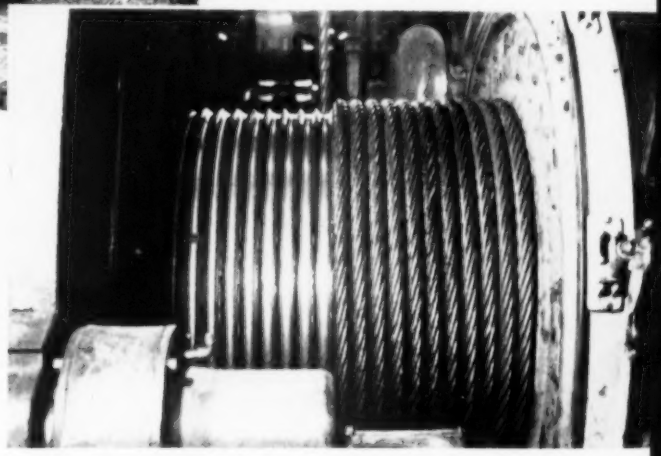
Firestone
BETTER RUBBER FROM START TO FINISH

Copyright 1958,
The Firestone Tire & Rubber Company

2⅜" Tiger Brand hoist ropes going through the boom point sheaves.

40-cubic-yard shovel stripping overburden at the Little Sister Mine of the Truax Traer Coal Company, St. David, Illinois.

Main hoist drum with well-lubricated Tiger Brand Rope in excellent condition after long service.



Little Sister Shovel has big "muscles" of USS American Tiger Brand Wire Rope

This 40-cubic-yard shovel, owned by the Truax Traer Coal Company, has been removing overburden at the Little Sister Mine near St. David, Illinois, for more than nine years. The hoist line is a 550-foot, 2⅜-inch diameter Tiger Brand Wire Rope, and the four boom supports are also Tiger Brand.

During this period, millions of cubic yards of rock and earth have been moved, and the Tiger Brand Wire Ropes have given long service life and dependable operation.

Since this 40-cubic-yard shovel went into service, we have seen the size of big shovels advance to 55, 60 and 70 cubic yards . . . and most of these big strippers are equipped with American Tiger Brand Wire Rope. Why? Because Tiger Brand is quality-controlled from ore mines to finished product under the direction of one of the finest wire rope engineering staffs in the country. They can utilize any of the basic research being conducted by United States Steel Corporation. What's more, they have unsurpassed plant facilities to produce the largest or the smallest wire rope you need. That's why Tiger Brand gives you longest service at least cost.

Write now, for our latest booklet on wire rope. American Steel & Wire Division, Rockefeller Building, Cleveland 13, Ohio.

USS and Tiger Brand are registered trademarks

American Steel & Wire Division of USS United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors • Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors • United States Steel Export Company, Distributors Abroad

What's Different About MURPHY DIESEL POWER?

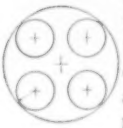
NO OTHER ENGINE IN MURPHY'S SIZE AND POWER RANGE CAN GIVE YOU ALL THESE FEATURES

"TRUE" DIESEL OPERATION—Unlike most other small diesel engines, Murphy Diesels operate as "true" diesels. This advantage comes from Murphy's Unit Fuel Injection, open-type combustion chamber, and other advanced design features.

INSTANT RESPONSE WITH HIGH-RISING TORQUE—Murphy's exclusive Hydraulic Servo-Type Governor harnesses lubricating oil pressure to adjust injector controls for instantaneous response to load change. It means more tons per hour.

LOWER FUEL CONSUMPTION—The combination of Murphy Diesel's plain, open combustion chamber and unit fuel injection assures *complete* combustion. You get maximum power from each drop of fuel, with less engine wear, and cut the cost of production.

MORE WORKING POWER—Murphy Diesel is a heavy-duty engine, with working power to take the toughest conditions in stride. Four valves per cylinder give greater breathing capacity than conventional 2-valve design and permit higher power output. Cooler-running engine and almost unlimited valve life cut maintenance and operating costs.



These Murphy features are among the many big reasons why Murphy Diesels are gaining wider acceptance with contractors everywhere. In addition, you can select from a wide range of sizes in either full diesel (96 to 264 HP), Dual-Fuel models (144 to 230 HP), Generator Sets (64 to 165 KW), or Mech-Elec Units for delivering electrical and mechanical power separately or simultaneously. See your Murphy Diesel Dealer today.

MURPHY DIESEL COMPANY

5307 W. Burnham St., Milwaukee, Wisconsin

SALES . . . PARTS . . . SERVICE

Throughout the Nation

380 RO

Speed Sand and Gravel Removal With Bucyrus-Erie Dependability

Bucyrus-Erie dependability is helping to lower costs in sand and gravel plants all over the country. A few of these operations are shown here. The machines on these jobs are built tough. Parts are large, strong, few in number — there is little that can go wrong. Machinery is arranged simply, compactly to provide strength, durability and stamina. Look over the sand and gravel jobs pictured here. Then ask your Bucyrus-Erie distributor about the many economy features of the Bucyrus-Erie ⅜ to 4-cu. yd. line of excavators. Do it today. 463E58C

This 88-B strips overburden at a gravel pit south of Dallas, Tex. "Our 88-B is doing a very good job," says the project superintendent. "It's just what we needed for this location." The owners of the 88-B, who operate three gravel plants in the Dallas area, benefit from its fast, easy handling and from the lack of mechanical trouble.

BUCYRUS ERIE

A Familiar Sign at Scenes of Progress

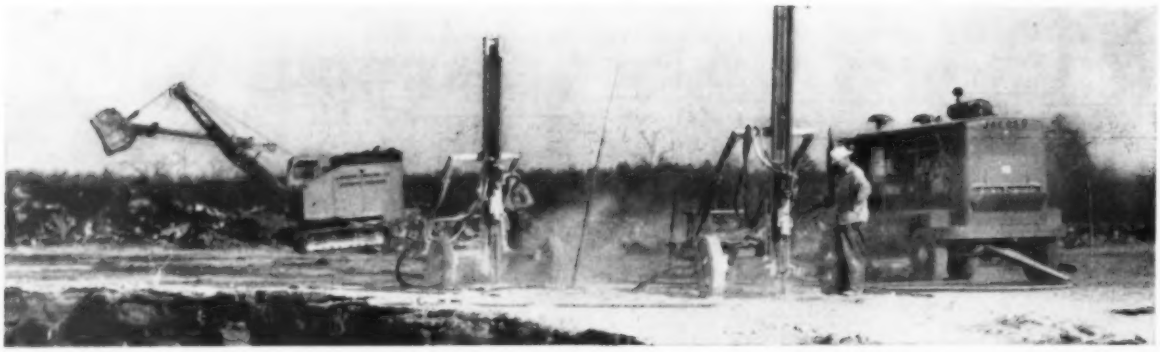
BUCYRUS-ERIE COMPANY • SOUTH MILWAUKEE, WISCONSIN

A sizable base course crew and an entire rock plant operation depend on this 38-B shovel to dig continuously without breakdowns. It is not disappointing its owners, who praise it for its dependability. The 38-B is working in Texas.

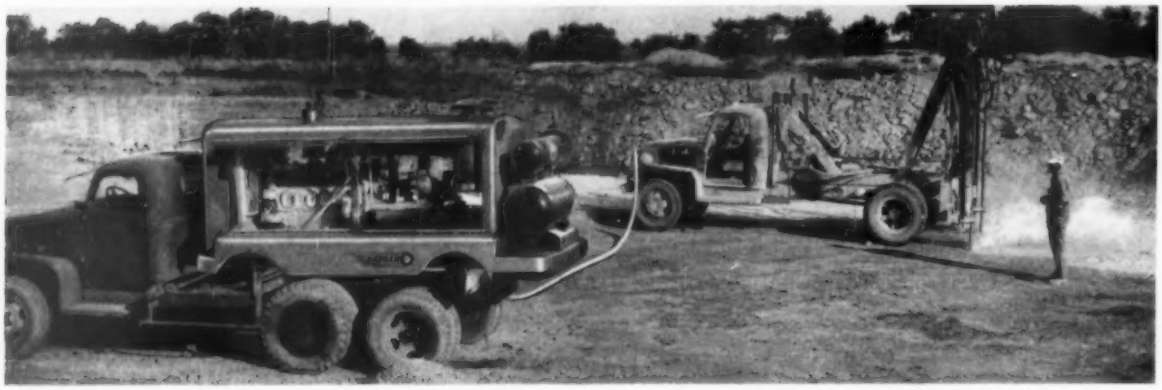
A 71-B loads sand and gravel for highway construction in New York state. The job, consisting of close to a million yards of material, is located on Long Island. Here, as on scores of construction projects from coast to coast, Bucyrus-Erie dependability pays off.

"We own four 15-B draglines and consider them the very best buy on the market," says the satisfied owner of the 15-B shown here. This machine loads pit gravel for rural road maintenance in Alabama. In this wet pit operation, the dragline excavates a staked-out 6-acre area to a depth of 6 feet.

A Bucyrus-Erie 54-B dragline teams up with a 51-B (in background) to excavate river floor overburden and pit run gravel. The material from this pit supplies a commercial gravel plant northeast of Ft. Worth, Tex. The steady operation of these machines is important because the company's six plants depend on them for a continuous supply of sand and gravel.



Logging 500′ per shift in limestone with low cost Jaeger air.



Jaeger "600" and dual drill rig, both truck mounted, handle several locations.

Track drills and readily truck mounted Jaeger rotaries make mobile "teams."

Only Jaeger gives you 600 cfm @ 1650 rpm

Using the same GM 6-71 diesel engine as all other "600" rotaries, your Jaeger gives you full rated capacity at 150 rpm slower speed (1650 instead of 1800). In 8 hours full load operation that totals 72,000 fewer revolutions, saving miles of engine piston travel and pounds of fuel.

Because all operation is below the continuous horsepower curve, engine maintenance is at a minimum. As for the compressor unit itself, many Jaeger rotaries have logged more than 3000 hours without requiring the replacement of a single vane.

125, 250 and 365 cfm models are comparable (1700 rpm full load speed instead of 1800 up). The difference puts money in your pocket. Ask any Jaeger user — or ask us for Catalog JC-7.

THE JAEGER MACHINE COMPANY

602 Dublin Avenue, Columbus 16, Ohio

Jaeger Machine Company of Canada, Ltd., St. Thomas, Ontario

Yes!...it's ALL STEEL

HP RANGE:
½ to 50 hp

RATIOS:
4:1—14:1—24:1 (or 20:1)

OUTPUT SPEED RANGE:
420 to 5 rpm

TORQUE RATINGS:
up to 31,500 lb-in

FALK
ALL STEEL
Shaft Mounted Drive

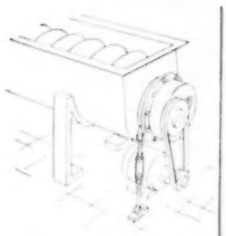
...Steel can "take it"!

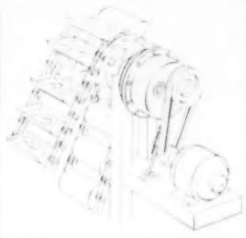
STEEL frame ...of fabricated plate supports all rotating elements—provides double the ability of iron to maintain vital alignment of revolving elements, even under shock load or external impact.

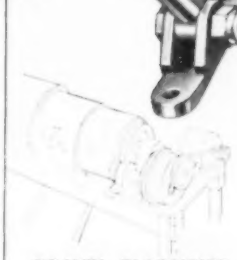
STEEL housing...will not fracture, serves only as protective cover and lubricant reservoir. Therefore, lubricant supply is safeguarded.

STEEL tie-rod and straddle-mounted tie rod brackets...are fastened to heavy steel frame by steel bolts in double shear.

A FEW TYPICAL APPLICATIONS

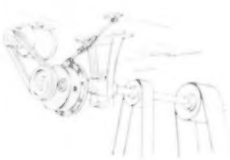

SCREW CONVEYOR


BUCKET ELEVATOR


GRAVEL CLASSIFIER

BELT CONVEYOR

APRON FEEDER


LINE SHAFTING

DELIVERIES TO MEET YOUR REQUIREMENTS

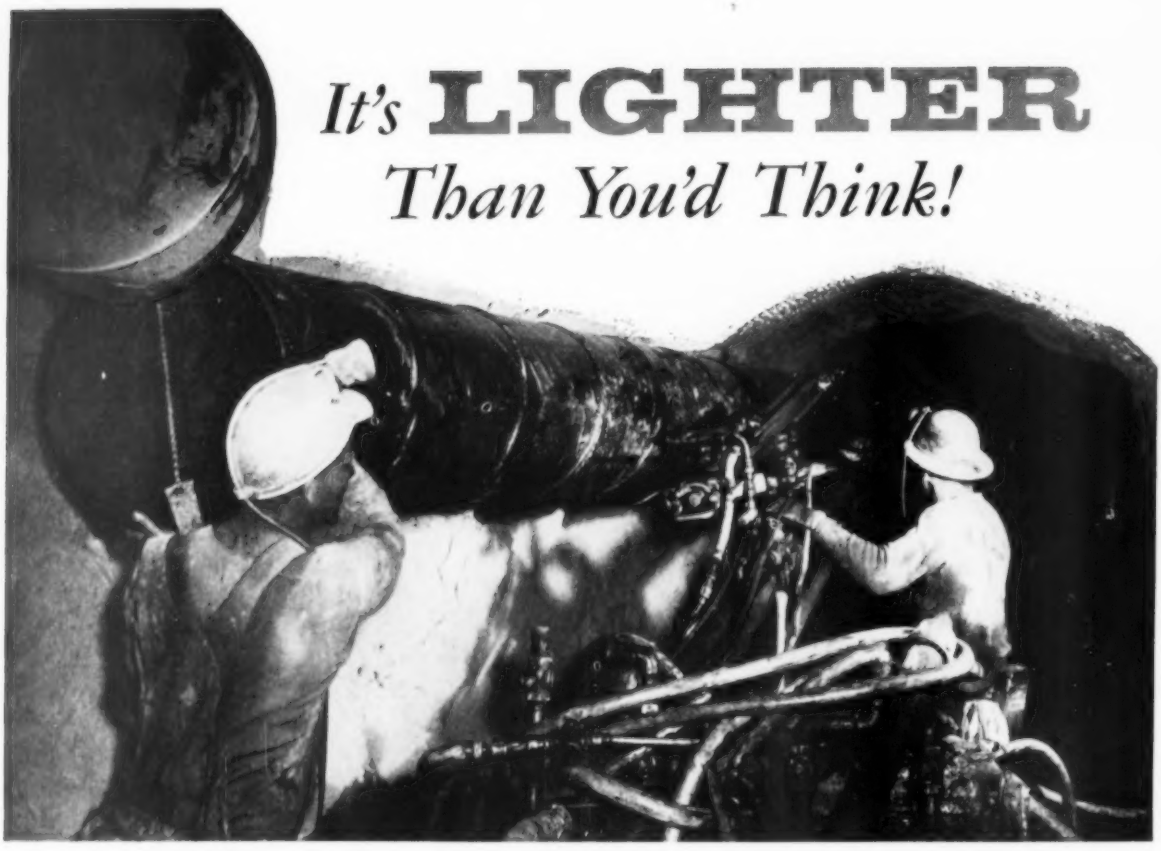
Off-the-shelf delivery from your Authorized Falk Distributor. *Shipment from factory or warehouse stocks* within 72 hours after receipt of your order.

Write for Bulletin 7100

THE FALK CORPORATION, 3001 W. CANAL ST., MILWAUKEE 1, WIS.
Representatives and Distributors in Most Principal Cities
Manufacturers of Quality Gear Drives and Flexible Shaft Couplings

FALK
...a good name in industry

It's LIGHTER *Than You'd Think!*



How NAYLOR Combines Built-in Strength and Safety With the Economies of Light Weight

There's good reason why NAYLOR Spiralweld pipe gives you performance you'd expect only from heavier pipe.

NAYLOR'S exclusive spiral-lockseam structure makes this possible. It provides the extra collapse strength and safety necessary for heavy-duty service. Yet its light weight assures easier handling. Installation is faster, too. You save even more time and work when you use the one-piece NAYLOR Wedgelock coupling to speed connections.

Note how NAYLOR pipe hugs the wall—and how easily lines can be extended with only one side of the pipe in the open.

For moving air, water or tailings—it will pay you to consider the extra performance built into NAYLOR pipe.

To get full details, write for Bulletin No. 507

NAYLOR

NAYLOR PIPE COMPANY

1257 East 92nd Street, Chicago 19, Illinois

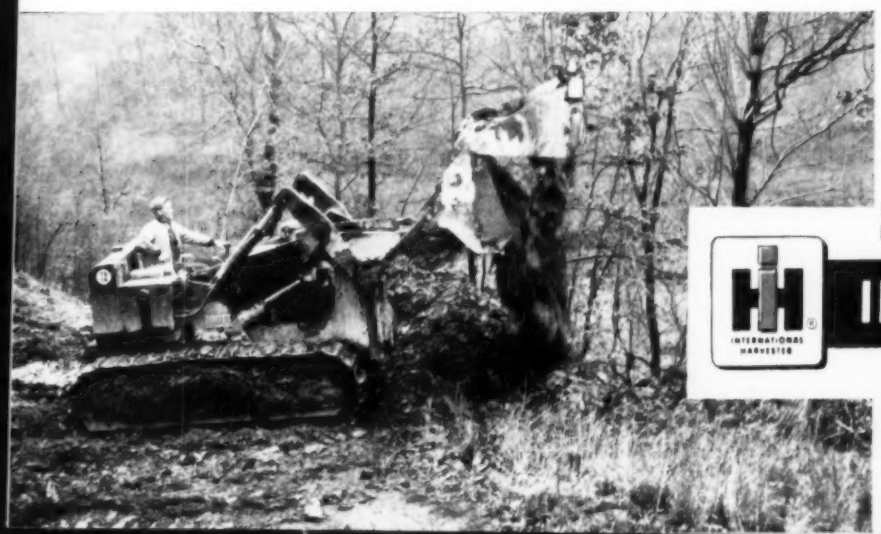
Eastern U.S. and Foreign Sales Office
60 East 42nd Street, New York 17, N. Y.

"On-the-job versatility has made my 4-In-1 so popular that mine operators demand it to do their jobs," reports Mr. Reed. "Ordinarily in mine opening operations, two machines are needed—an excavator-loader and a 'dozer. The 4-In-1 is both!" Larger view shows his 4-In-1 building a haul road as a 'dozer. Smaller photo shows it opening up a drift mouth using Skid-Shovel action.

How a 4-in-1 grabs jobs from limited-duty rigs ...works where others can't!

Instead of doing high-priced "piece work" with several single-job machines, D. M. Reed, Langley, Kentucky, does an amazing variety of specialized operations with one cost-cutting machine: an International Drott TD-14 4-In-1! His coal mine operator customers demand the 4-In-1's services for opening drift mouths, building haul roads, excavating and grading, doing drainage and tipple maintenance work—and other multiple-operation jobs. Result: Contractor Reed often has two other unemployed crawler dozers, as the 4-In-1 goes profitably on its job-taking, money-making way!

See for yourself how an International Drott 4-In-1 cuts your equipment investment, reduces labor and operating expense, and multiplies your profit range by four! Just move the "machine selector" lever—try the built-in clamshell, "carry-type scraper," bulldozer, and Skid-Shovel actions. Also, measure the exclusive advantages of shock-swallowing Hydro-Spring, to increase capacity, reduce downtime. Ask your International Drott Distributor for a 4-In-1 demonstration.



"The 4-In-1's clamshell action is a real time-saver," adds Mr. Reed. "With bottom-dumping it will discharge even the wettest, stickiest material cleanly." Here, the outfit proves bottom-dumping advantages, handling wet clay spoil that would stop ordinary buckets "cold!"

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

INTERNATIONAL®
DROTT®

To prepare new crushers for a hard life, Wasco County, Oregon, hardfaces rollers with Victor alloy rod. The rollers showed no discernible wear after crushing 3100 tons of extremely hard and abrasive basalt.

Lifesaver for new or used equipment VICTOR Hardfacing Alloys

Wasco County, Oregon, uses lots of crushed basalt. This rock crushes readily, yet is extremely hard and highly abrasive, consequently tough on rollers. So, as standard practice, Supt. Wayne Weeks hardfaces all rollers in brand new crushers, before ever they crush a single basalt rock. He reports hardfacing of new equipment prevents excessive wear of surface material, thus maintaining roller size during the work hardening period.

On this new crusher, he used 200 lbs. of Victor #0 semi-automatic wire, size 7/64", to hardface roller faces, and 50 lbs. of tube Victorite coated for finish work around the roller edges. Longer crushing life will quickly pay for the rod.

You, too, can save money and extend the life of equipment subjected to abrasion, impact and heat. Simply make it standard practice to hardface both new and worn equipment with Victor alloy rods. Complete line of 27 different hardfacing rods assures you a right rod for every hardfacing need. Full range of sizes for both acetylene and electric AC and DC applications, either hand, automatic or semi-automatic. Order a supply from your Victor dealer TODAY.

FREE Victor Hardfacing Manual shows you right rod to use and how to apply it. Write us NOW for your copy.

VICTOR for welding

Profitable dealerships open; inquire now!

VICTOR EQUIPMENT COMPANY 42

ALLOY ROD AND METAL DIVISION

13808 E. Imperial Highway, Norwalk, Calif. • Wakita, Oklahoma

Here's the easy, cost-saving way to remove Clinker Rings—

Remington Industrial Gun

WITHSTANDS HIGH TEMPERATURES AT KILN HOOD. Special steels and castings enable the Remington Industrial Gun to operate safely at kiln hood temperatures. Gun is easily installed by attaching bolster to hood I-Beam or movable mount as shown.

You save valuable man-hours in removing clinker rings with the hard-hitting Remington Industrial Gun. A pull of the gun's lanyard does the work of many sledge hammers... brings rings and other troublesome kiln formations down in minutes!

No need to wait until kiln cools off. In fact, you don't have to turn off flame or stop rotation until you're ready to shoot. Then just load . . . aim at ring juncture and BAM—the 9,000 ft.-lbs. of knockdown power from a Remington Industrial Magnum* shell smash into the ring! It takes only a short time to dislodge it without damage to kiln or lining—and you're quickly back on full-time schedule.

Here's proof: One Georgia refractory saved 222 man-hours and gained 26 hours' production time per month with this easy-to-use, one-man tool. So don't let clinker rings "bottleneck" your plant, let the Remington Industrial Gun cut downtime to a minimum. Just clip and mail coupon for our illustrated, fact-filled folder.

** For shorter kilns, Remington Standard Industrial Shells fill the bill. 7,500 ft.-lbs. of energy are delivered!*

Remington

DUPONT

Remington also manufactures the Model 455 and "Mighty-Mite" Stud Drivers for instant fastening into concrete or steel.

Industrial Sales Division PQ-7
Remington Arms Company, Inc.
Bridgeport 2, Conn.

Please send me your free booklet which shows how the Remington Industrial Gun speeds removal of clinker rings.

Name _____ Position _____

Firm _____

Address _____

City _____ State _____

Legal Decisions

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

There are various and many advantages to buyers, sellers, and producers of nonmetallic products who transact interstate business, rather than intrastate. Such advantages are lower taxation, the collection of damages from carriers for merchandise lost in transit, the Fair Labor Standards Act, injury suits, etc.

An important branch of taxation laws involve "sales" and "use" taxes. All states require payment of either a "sales" or a "use" tax. With respect to nonmetallic materials, some of which are delivered to purchasers by the sellers, it is important that the sellers keep books showing that the transportation charges are separate charges.

For example, in *Whitehill Sand and Gravel Company v. State Tax Commission,* 150 Pac. (2d) 370, it was shown that a company engaged in business of selling sand and gravel paid "sales" tax on the price of gravel at the pit, but that in some cases it either hauled the material or arranged for transportation to the purchasers.

The legal question presented the court was whether the company must pay the state "sales" tax on the price of the gravel at its plant or pit, or whether it must pay the tax on the total price to the purchasers, which included the pit price plus the transportation charges. In holding the tax payable on the "total" price paid by the purchasers, the court stated important law as follows:

"As to sales, they would constitute sales of the products at the point of delivery, including transportation charges, regardless of the general policy to sell at the pit, unless there was before the commission convincing evidence that acceptance of such orders was pursuant to negotiations to establish a contract of sale at the pit."

In other words, this court held that the company was within the law in paying the state "sales" tax only on the price of materials at the pit, provided that the bills showed the price of the gravel at the pit, with separate charges for transporting the gravel to the delivery points.

Screenings Not Taxable

Recently, a higher court held that rock screenings are not taxable. For illustration, In *Dolese Bros. Company v. Nichols,* 165 Pac. (2d) 982, it was shown that the Dolese Company is engaged in the business of operating a plant for crushing rock. The county tax assessor assessed screenings for taxation. These are small particles of rock and dust coming out of the crushed rock during screening.

The higher court reversed the ruling of the county tax assessor, and held the screenings not taxable, saying:

"It is the opinion of the court that said screenings were not taxable. . ."

Sales Tax Law Construed

It is now fully recognized by modern higher courts that interstate business must pay its way. In other words, it was not the purpose of the commerce clause to relieve those engaged in interstate commerce of their just share of state tax burdens, merely because of an incidental or consequential effect of the tax as an increase in the cost of doing the business.

For example, in *Morrison Company, Inc., v. State Board,* 135 Pac. (2d) 927, it was shown that a seller sold nonmetallic products f.o.b. the seller's location. These products were shipped to purchasers located outside the state. In holding the seller liable for payment to the state of "sales" tax, the higher court said:

"Sales to purchasers in another state are not withdrawn from federal control because the goods are delivered f.o.b. at stated points within the state of origin for transportation . . . In cases involving such taxes the court must take into consideration not only the commerce clause of the U. S. Constitution, art. 1, 8, cl. 3, but also the power of the state to tax for the purpose of continuing its existence. . . . While the purchasers in other states in most instances, of course, contemplated that the goods should be shipped by interstate carrier, that mere fact did not withdraw the property from the state's power to tax it."

Also, see *Blind Bull Company,* 101 P. (2d) 70. Sales of nonmetallic products were made in the state to various purchasers who hauled the products into another state for their use or consumption.

In subsequent litigation the higher court held that these sales were not exempt from the sales tax imposed by the state in which the products were sold.

Interstate Contracts

A legal question important to all buyers, sellers, and producers of nonmetallic products was asked recently by the official of a large corportation: "If a sale contract specifies that nonmetallic materials shall be shipped f.o.b. the seller's location, is this contract controlled by laws of the state in which the seller is located? I have a suit to defend and shall appreciate your detailed information on these points."

Fortunately, last month the higher court rendered an important decision involving this law.

For example, in *Standard Corporation v. Specialty Company,* 57 N. W. (2d) 706, the testimony showed these facts: A state law of Wisconsin provides that no foreign corporation shall transact business in the state until it files in the office of the secretary of state a copy of its charter, and receives a license to do business in the state.

A purchaser, while on a trip from New York into Wisconsin, signed a contract in Wisconsin with a seller (located in Wisconsin) to purchase certain materials. The contract specified that the materials were to be shipped f.o.b. Further testimony showed that the purchaser's principle place of business was in New York, but that branch places of

business are also maintained in Chicago and Los Angeles. However, it has no place of business in Wisconsin and has no officer, agent, or employee located in this latter state. The seller, pursuant to the contract, shipped f.o.b. Racine, Wis., a part of the materials but refused to ship the balance of the order. The purchaser in New York sued the seller in Wisconsin for damages.

The seller contended that as the purchaser is a foreign corporation without a license to "do business" in Wisconsin, the above state law rendered the contract void and also prevented the seller from being liable in damages to the purchaser for breach of the contract. In other words, the seller contended that because the purchaser had signed the purchase contract while within the state of Wisconsin, and because the materials were shipped f.o.b. Racine, Wis., the transaction was intrastate, and not interstate.

Also, the seller argued that because the contract itself did not specifically state the point of destination outside of Wisconsin to which the materials were to be shipped, some of the materials might have been shipped to the purchaser at some other points in Wisconsin, in which case there would be a transaction involving intrastate and not interstae commerce.

The higher court held that as the purchaser has offices located outside Wisconsin, although he signed the purchase contract in Wisconsin, intrastate commerce was not transacted. Also, as all shipments were to be made f.o.b. Racine, Wis., strictly interstate commerce was involved.

The higher court held that the transactions between the buyer and seller were interstate and not intrastate, whereby the purchaser could sue and recover damages from the seller for breach of its contract. This is so although the purchaser was not licensed to "do business" in Wisconsin.

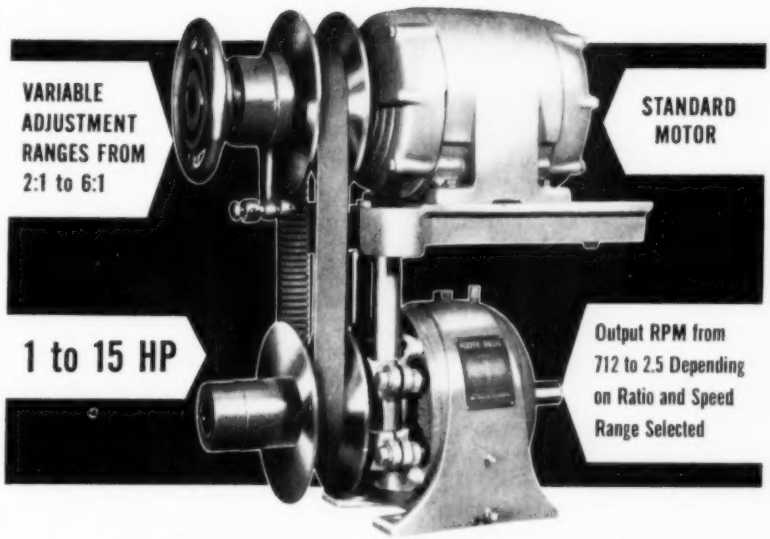
The higher court said:

"The mere act of a foreign corporation in going into another state and there making a contract for the purchase of goods to be shipped in interstate commerce, does not constitute 'doing business' within the state. It is therefore our conclusion that the contract in the in-

NEW FROM FOOTE BROS.

Vari-Mount

VARIABLE SPEED MOTORIZED DRIVE


VARIABLE ADJUSTMENT RANGES FROM 2:1 to 6:1
STANDARD MOTOR
1 to 15 HP
Output RPM from 712 to 2.5 Depending on Ratio and Speed Range Selected

VARI-MOUNT—the new Variable Speed Motorized Drive offers infinitely variable speed selection, greater flexibility of operation, wide adaptability, easier maintenance and the sound design you expect from Foote Bros.

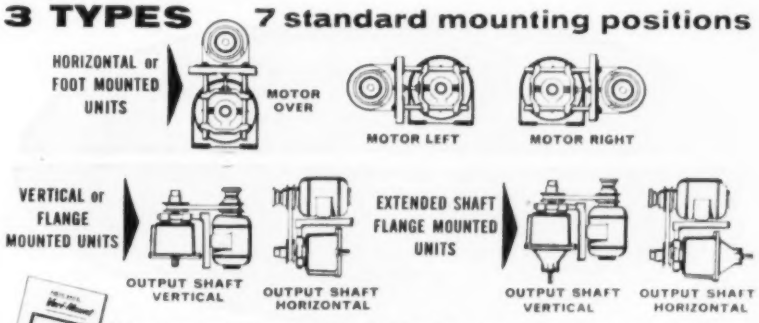
With a Vari-Mount, you can use your own motor—old or new NEMA Standard—or, the unit can be supplied with any standard motor of your choice. The Vari-Mount Reducer incorporates Duti-Rated Lifetime Gearing with file-hard tooth surfaces and tough, ductile cores for maximum life and efficiency.

Positive handwheel control of the adjustable pulley permits pin-point accuracy in speed selection over the entire range. Vari-Mount Units may be equipped with Remote or Automatic speed selection devices if required.

Spring loaded, self-centering Variable Pulley and close-coupled in line design insures permanent belt alignment, smoother performance, and minimum overhung load on motor bearing. No thrust load is imposed on motor bearings at any speed or during speed changes.

Quick belt changes made possible by the wide-open design of the Vari-Mount, together with easily accessible lubrication fittings make maintenance an easy matter.

3 TYPES 7 standard mounting positions



Want complete details?...Write for Vari-Mount Catalog today

this trademark stands for the finest industrial gearing made

FOOTE BROS. Duti-Rated LIFETIME GEARING

T. M. REG. U. S. PAT. OFF.

FOOTE BROS.

Better Power Transmission Through Better Gears

FOOTE BROS. GEAR AND MACHINE CORPORATION

4571 SOUTH WESTERN BOULEVARD · CHICAGO 9, ILLINOIS

Enter 227 on card, page 211

stant case contemplated shipment of the motors to a point of destination outside of Wisconsin so as to involve interstate commerce."

Law of Interstate Shipments

Another reader asked this question: "At what moment does goods shipped in interstate commerce become subject to instrastate laws?"

The answer is: An interstate shipment becomes subject to intrastate laws the instant the goods actually are legally accepted by the consignee, but not before.

For example, in *Chapman v. United States*, 151 Fed. (2d) 740, it was shown that nonmetallic materials were consigned, freight prepaid, to a purchaser who unlawfully broke the seal on one of the doors of the freight car and removed a part of the materials.

In later litigation, the court was asked to decide whether the materials remained in interstate commerce after the car seal was broken

The answer to this question directly affects suits by sellers against consignees for payment of shipped materials; suits by employees injured while unloading materials; suits involving the Fair Labor Standards Act, unemployment compensation and Workmen's compensation; and suits involving damage to or loss of the goods; and many other suits including prosecution of persons who steal merchandise from the car.

This higher court held that after the car seal was illegally broken by the consignee, and before actual acceptance by the consignee, the materials remained in interstate commerce. The court said:

"We think it cannot be said that the interstate transportation had been completed by arrival at destination and delivery there to the consignee. Ordinarily a carrier's contract is not fulfilled until the goods are in the possession of the consignee, and the general rule is that a shipment does not lose its interstate character until it arrives at its destination and is there delivered."

For comparison, see *O'Kelley v. United States*, 8 Cir., 116 F. 966. In this case an interstate shipment had been delivered to the consignee, and control over it by the carrier had been completely surrendered to the consignee. The testimony showed that the car containing the shipment was set on a spur track, and the consignee was notified of its arrival. On the receipt of this notice the consignee accepted delivery, removed a part of the shipment, closed the car door, and secured it with his private padlock.

The higher court held that this merchandise thereafter was in intrastate commerce, and said:

"The decision is based upon a finding of surrender of control of the shipment by the carrier to the consignee."

Another important point of the established law is that a common carrier always is liable for damage to or loss of shipped materials which it impliedly, or from past custom, accepts from a consignor.

For illustration, in *Farmers Gin Co. v. Texas*, 232 So. (2d) 890, a shipper sued a common carrier for damages on account of damage to materials. The testimony showed

KNOW HOW

More Experience Means a Better Job

. . . and Southern Tire Company—one of the nation's oldest large tire retreaders—has over 55,000 tires worth of experience in expert retreading and repair service. And speaking of service, Southern Tire's fast pickup and delivery service at your job site . . . after work hours . . . greatly reduces downtime costs and saves you important time and money. Regardless of what your particular job requirements are, Southern Tire can supply the size and tread design best suited to your needs. Whether you operate light or heavy equipment, you can get new tire mileage at approximately half the cost, when you call on Southern Tire for your retreading needs.

Modern 3-Sectional Molds. No buffing to breaker strips regardless of growth.

Rock Service, Traction Types or Rib Treads, and all sizes available.

Always Deal With an Independent — The Pioneers of The Industry. More Experience Assures You of Better Service.

SOUTHERN TIRE COMPANY

1414 Broadway
SHEFFIELD, ALA.

Phone Collect
EV 3-2312

that the shipper delivered the materials on the carrier's platform, whereby the carrier became charged with the responsibility of exercising "ordinary" care to protect the materials from damage.

The evidence showed that the carrier had failed to provide a watchman to patrol its platform. The jury held the carrier liable, and the higher court approved the verdict, saying:

"Without attempting to set forth the supporting circumstances, it must suffice to say that in our opinion the evidence was sufficient to authorize the jury in finding . . . that one or more of the foregoing omissions constituted negligence on the part of appellee (carrier) and a proximate cause of the damages for which recovery is sought."

Therefore, the outcome of this late higher court law suit establishes this law: The instant merchandise shipped from one state into another state is delivered by a shipper, or consignee, to the carrier's platform or depot, such merchandise is within the control of the carrier and automatically becomes subject to interstate commerce laws.

Liability for Damage

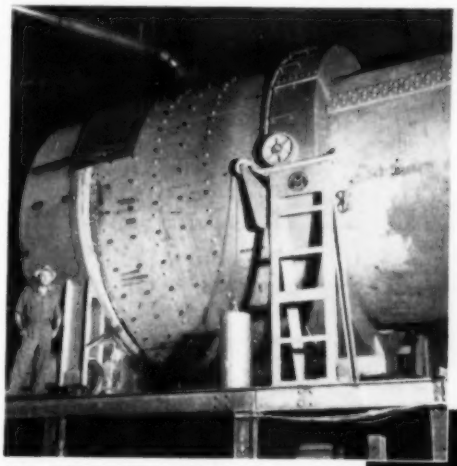
On the subject of liability for damage, this case was described by a reader: "Several days ago we received a shipment of merchandise marked f.o.b. our city. In the sale contract there was a clause which provides that the seller's agent must sort out and repack the merchandise, and address the various smaller containers to our customers, to whom we intend to sell the merchandise. In other words, we are wholesalers and the merchandise was shipped to us in large containers, but the seller agreed to repack the merchandise for shipment to various customers to whom we would sell different quantities of the goods. While the merchandise was in our warehouse, a water pipe froze and burst at night and ruined the merchandise. Our question is: Who is liable for damage to this merchandise?"

It is our contention that since the seller had agreed to pack the merchandise in our warehouse, the title to the merchandise did not pass to us, notwithstanding the f.o.b. clause to the usual contrary."

A review of late and leading higher court decisions disclose that some confusion has arisen through use of the term "f.o.b." The term f.o.b. originally related to transportation of merchandise by sea. When applied to railroad and motor truck transportation, it lost some of its clarity. Hence, under different circumstances the term f.o.b. may have a different legal meaning. Generally speaking, *any merchandise shipped f.o.b. to a named point by a seller means that title to the merchandise passes to the purchaser at this point.*

For illustration, in *Seabrook Farms v. Commodity Credit Corporation,* 206 Fed. (2d) 93, it was disclosed that a seller and a buyer signed a sales contract which contained a clause marked "f.o.b." the purchaser's location.

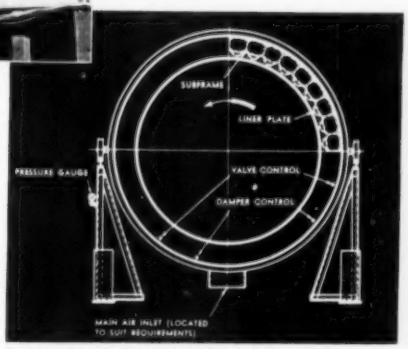
In subsequent litigation the lower court held, after considerable discussion and presentation of testimony, that the title to the merchandise passed to the purchaser upon its delivery to its location. The higher court approved the verdict, saying that in event of destruction or damage to the merchandise after



Type S Recuperator applied to Unit-fired Rotary Cement Kiln

greater output and economy with a Manitowoc recuperator

- FUEL SAVINGS
- BETTER QUALITY
- INCREASED OUTPUT
- IMPROVED GRINDABILITY
- LOW COST



Front, cross section view of Type S Recuperator

Cement mills throughout the world are finding it highly advantageous and profitable to install a Manitowoc Recuperator. Attached to your existing kiln, it provides greater economy, an improved quality of cement, greater efficiency and increased output.

The type S design shown above is particularly suited to kilns requiring high volumetric air capacity and maximum output.

In all cases this Recuperator may be readily attached to an existing rotary kiln, requiring only a minimum of labor in erection, involving no foundation or brickwork and occupying a minimum of floor space.

It will pay you to get full information on all types of Manitowoc Recuperators. Find out how much they can do for you—and why it will pay you to install one on your kiln.

MANITOWOC SHIPBUILDING INC.

MANITOWOC, WISCONSIN

Enter 229 on card, page 211

PAYHAULER FLEET

whips 17% grade with bonus loads

The Caldwell Engineers' five-unit 65 Payhauler® fleet highballs 2,500 cu yd of shot rock 1,000 feet daily up a haul road with 17% average grade. That's how this subcontractor keeps on schedule! His contract calls for excavating and crushing 165,000 tons of rock on the $13,000,000 hydro and flood control Oliver Dam under construction at Columbus, Ga.

Making the 17% grade with bonus loads is routine for the Payhauler fleet on this newest of all dams being built by the Georgia Power Co. at Columbus.

"These are crooked haul roads," reports excavation foreman Dudley Rabb, "but our Payhauler fleet is whipping them to keep us on schedule. The rigs haul through axle-deep water 50% of the time...make pull-outs up roads that rise 170 feet in 1,000 feet...yet speed bonus loads to crusher and stockpile."

Prove the get-away surge, and up to 25% faster haul speed of an International Payhauler—the result of bonus turbo-charged diesel power; road-matched and load-matched gear choice; and the power-cushioning leverage of planetary drive axles.

See how a Payhauler shortens the cycle with pick-up truck spotting ease. Discover how exclusive high reverse, zip-around power steering, and grade-beating power boost your profits. Try split-second dumping with the double-acting hydraulic hoist. Measure the advantage of Payhauler operating ease, and downgrade safety of positive Torqmatic braking! See your International Equipment Distributor for a demonstration!

International® Construction Equipment

International Harvester Co., 180 North Michigan Ave., Chicago 1, Ill.

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

it was delivered by the carrier, the purchaser must suffer the loss.

Different Courts Disagree

As previously mentioned in these pages different courts may disagree. Hence, a law suit may be carried through many different courts with many different verdicts. Naturally, however, city ordinance is void if it violates the United States Constitution.

For illustration, in *New York Trap Rock Corporation v. Town of Clarkstown*, 146 N. E. (2d) 188, it was shown that a city enacted an ordinance which restricted an area for residential purposes and uses only, thus preventing the New York Trap Corporation from using its land for a rock quarry.

In subsequent litigation the Special Court held the ordinance invalid. The next higher court reversed the judgment and held that the New York Trap Rock Corporation was precluded from attacking the validity of the ordinance which prohibited removal of rock from its land. The New York Trap Rock Corporation then appealed to the higher court, contending that the ordinance was arbitrary, capricious, and unreasonable, and an invasion of constitutional rights of the New York Trap Rock Corporation and was therefore void. The higher court upheld the last decision of the lower court holding the ordinance valid, but went forward to explain that the ordinance may be later held void if the future testimony proves that it deprives the New York Trap Rock Corporation of property without due process of law in derogation of the fourteenth amendment of the Constitution.

Plant on Lulu Island Opened By Anglo Canadian Cement

Anglo Canadian Cement Limited has opened a plant on Lulu Island in British Columbia to serve builders with ready-mixed concrete, sand, gravel, and building supplies.

This is the company's third plant, the others being located at Vancouver and Whalley, B. C.

Anglo Canadian will begin producing 4-, 6-, and 8-in. concrete drain tile soon, according to S. W. L. Kelly, sales manager.

Rotatool used on Schramm Truck Mounted Rotadrill drills up to 35'/hour in hard rock. Makes straighter, cleaner holes.

IN PENNSYLVANIA HARD ROCK . . . *

Rotatool drills 50% faster

Here's the fastest-drilling tool you've ever seen for making hole. In Pennsylvania hard rock rates up to 35 feet per hour are achieved with the Schramm Rotatool for bottom-hole drilling—an increase of 50% over old methods. Average rates vary from 15-20 feet per hour in trap rock and 25-30 feet in hard limestone. Reason: Rotatool combines the crushing power of a rock drill with the speed and efficiency of a rotary drill to give you a bottom-hole percussion tool to produce maximum fracturing action.

Rotatools are available in two sizes: The larger, for Truck and Crawler Mounted Rotadrills, takes 6" and 6½" bits and requires 350 cfm of air @ 100 psi. The smaller, for Pneumatractor Mounted Rotadrills, takes a 4½" bit and requires 100 cfm @ 100 psi.

Heavier hammer delivers more crushing energy per blow for better breakage, faster penetration.

Impact delivered to the bit—none lost through drill pipe. Makes fast, deep holes where many drills are stopped.

Full information about the Schramm Rotatool is contained in the New Bulletin SRT-58. Write for your copy today.

See the Yellow Pages for local Sales, Service and Rental of Schramm Air Compressors.

Rotatool for bottom-hole drilling fits all Schramm Rotadrills—Truck, Crawler or Pneumatractor mounted without affecting their uses as rotary drill.

*Actual Drilling Rates in Pennsylvania Hard Rock	
Churn Drill	20'—30' per day
Competitive Rotary Drill	20'—22' per hour
Schramm Rotadrill with Tri-cone Bit	22'—24' per hour
Schramm Rotadrill with Rotatool	30'—35' per hour

Schramm, Inc.

MANUFACTURERS OF AIR COMPRESSORS

640 North Garfield Ave. • West Chester, Pa.

Enter 231 on card, page 211

IT COSTS NO MORE TO USE THE BEST

REPLACE WITH
"Indian Brand"

MANGANESE STEEL
Shovel Dippers
Dipper Teeth
Shovel Treads

Crusher Jaw Plates
Mantles—Concaves
Bowl Liners
Roll Shells

Pulverizer Hammers
Grate Bars—Breaker Plates

Ball Mill Liners
Screen Plates

The Frog, Switch & Mfg. Co. CARLISLE, PA.

ESTABLISHED 1881

Enter 232-A on card, page 211

Manufacturers' News

Brunner & Lay Rock-Bit of Asheville, Inc., has opened a new plant in Albuquerque, N. M., at 2224 Broadway, S. E. A complete stock of Brunner & Lay tools will be available — carbide Rok - Bits, Intra-Set and conventional drill rods, bit couplings, adapters, and extension steel, as well as pneumatic tool accessories. Drill steel will be serviced and fabricated at this plant.

The Lincoln Electric Company, Cleveland, Ohio, has opened new district offices in Memphis, Tenn., and Albany, N. Y.

ROBERT W. THOMAS has moved from the Philadelphia office to become district manager in Memphis.

RUSSELL S. HALE, who has been transferred from the Chicago office, is district manager of the new Albany office.

The organizational setup of the new Multiwall Bag Division of the West Virginia Pulp and Paper Company, New York, N. Y., has been announced.

Administrative direction of the new division, which comprises four multiwall bag plants recently acquired from the Fulton Bag and Products Company and Arkell and Smiths, will be handled from the central offices of the paper company in New York. Management and sales personnel of the two companies which formerly operated the multiwall plants have been consolidated into a single unit within the one parent organization.

Field responsibility for the division's activities, including overall direction of the plants at Wellsburg, W. Va., Mobile, Ala., New Orleans, La., and St. Louis, Mo., will be shared by two regional managers. Sheldon Y. Carnes, formerly vice-president of Arkell and Smiths, will be regional manager with headquarters in New York. Jason M. Elsas, formerly president of Fulton Bag and Products Company, will be regional manager, with headquarters in New Orleans.

Other executive assignments include Thomas L. Jones and J. Frank Greeley as regional sales managers, and Arnold C. Harmsen and Peter H. Walmsley as regional production managers.

DONALD H. NINOW has been named manager of the Moline, Ill., branch office for the American Air Filter Company, Inc., succeeding FRANK TYLER, who has retired.

Mr. Ninow has been associated with Herman Nelson and American Air Filter since 1948. He served one year as branch manager of the Syracuse, N. Y., office for AAF.

HAROLD R. MANTLE, auditor of Dravo Corporation, Pittsburgh, Pa., has been named assistant to the executive vice-president. Mr. Mantle joined Dravo in 1933 in the Operations Department and has been auditor since 1955.

BRAND NEW! 10 H.P. ELECTRIC MOTORS
230 V. D.C. 1750 RPM size 2 FA
Horizontal Mounting — Drip-Proof Enclosure — Stabilized Shunt Winding
40" C Ball Shaft Bearings — Grease Cup Type Lubrication
$225.00 ea. 3 for $600.00 F.O.B. Chicago
LIMITED QUANTITY

BRAND NEW! GMC DETROIT DIESEL
SPARE PARTS

Exhaust Valve Rocker Arms
P/N 5150305
6@ $2.25 each in lots of 48
6@ $2.50 each in lots of 12
P/N 5150304
6@ $2.25 each in lots of 48

Connecting Rods—P/N 5154332
New, Export Packed
6@ $8.50 each in lots of 24
6@ $9.50 each in lots of 6

Piston Pins—P/N 5153590
Lots of 48—$ .90 each
Lots of 12—$1.00 each

Rotor Gear Sets—P/N 5153334
Lots of 6 sets—$10.00 per set

Cam Follower Assemblies—P/N 5159837
Lots of 48—$1.40 each
Lots of 12—$1.50 each

Exhaust Valves—P/N 5153737
Lots of 48—$1.20 each

Filter Elements—P/N 5226888
Lots of 200—15c each

Raw Water Pump Impeller Sets —P/N 5161023
Lots of 6 Sets—$4.00 Per Set

All Prices F.O.B. Chicago

NEW ROLLER CHAIN SPECIALS
#80 SINGLE STRAND — COTTER PIN. MFD. ATLAS. $1.80 Ft., Min. order 50 Ft. In 10-Ft. Lengths.
#80 SINGLE STRAND, RIVETED. BALDWIN—REX or EQUAL. $1.60 Ft., Min. order 50', 5', 7½', 10' Lengths.
#100 SINGLE STRAND, RIVETED ATLAS. MORSE, WHITNEY. $2.25 Ft., Min. Order, 35'.

GROBAN SUPPLY CO. DEPT. PQ-7
1139 SO. WABASH CHICAGO 5, ILL.

Enter 232-B on card, page 211

Napco Industries, Inc., Minneapolis, Minn., has named PAUL J. WOLFERT to the newly-created position of marketing director.

Formerly general sales manager for the Blaw-Knox Company, Matoon, Ill., Mr. Wolfert has spent over 25 years in the construction equipment field.

P. J. Wolfert

J. O. Wine

The Contractors Machinery Division of The Yale & Towne Manufacturing Company has appointed JAMES O. WINE to serve as district sales representative for the *Trojan* line of tractor shovels in the Middle Atlantic States, New England, and eastern Canada, with headquarters in Allentown, Pa.

Prior to joining the Trojan division of Yale & Towne, Mr. Wine served as the eastern sales representative for the Allison Division of the General Motors Corporation.

The Quaker Rubber Division and the Leschen Wire Rope Division of the H. K. Porter Company, Inc., New York, N. Y., have opened a joint sales and service branch office in New Kensington, Pa., to serve West Virginia, eastern Ohio, and western Pennsylvania. Located at 450 Second Street, the branch provides added office space and combined warehouse facilities for both divisions.

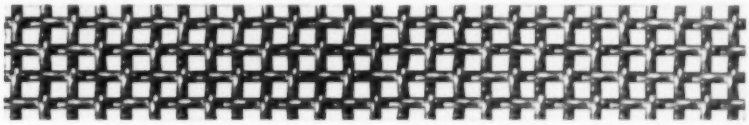
Announcement has been made of the appointment of FRED R. MOON as East Central District manager for the Daybrook Hydraulic Division, Young Spring & Wire Corporation, Bowling Green, Ohio. The East Central District territory includes the states of Ohio, Indiana, West Virginia, Kentucky, and the western portions of Pennsylvania, New York, and Virginia.

The Chain Belt Company, Milwaukee, Wis., has acquired 92 acres of land in Madison, Ind., to provide additional manufacturing capacity for the company's heavy machinery lines. The site was chosen because of its commercial transportation facilities and its central location in relation to certain market areas.

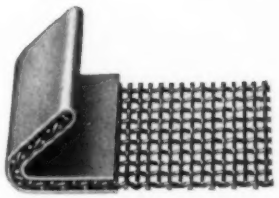
A new plant building to be constructed at the site will permit consolidation of Chain Belt's present manufacturing operations now located in Niles and Newton Falls, Ohio, and Rock Island, Ill.

JOHN A. MCGUIRE has been elected an executive vice-president of the Thor Power Tool Company, Chicago, Ill., to share a twin office with W. A. NUGENT, who has held a similar position for the last 10 years.

B. J. ROBERTS, sales manager for the Deister Machine Company, Fort Wayne, Ind., since 1925, when he first joined the company, died recently at the age of 79 years. Because of ill health during the last year, Mr. Roberts was unable to take an active part in the business.



TYLER SCREENS LAST LONGER

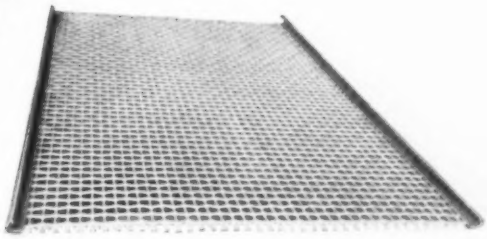


Tyler Type "AX" Hook Strip. For wire diameters from .047" to 5/16" inclusive.

Tyler Type "CX" Hook Strip. For wire diameters .041" and smaller.

Tyler Woven Wire Screens are woven with laboratory approved wires on precision machines. The high quality of Tyler Screens is apparent in their long life and service under the most difficult of screening conditions.

Tyler Screen Sections are furnished for all makes of vibrating screens in all meshes and metals. Each section is fabricated with the right type of edge or hook strip for the specification of screen cloth and to fit the particular make and model of screening machine on which it will be used.

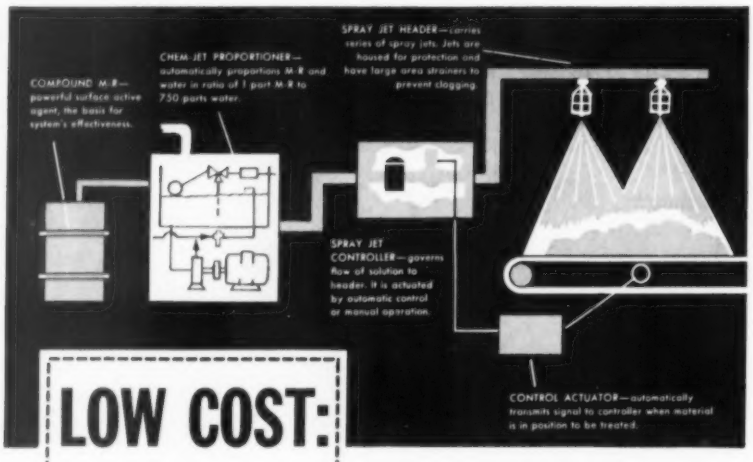


Telephone **HE 1-5400** • *Teletype* **CV 586**

THE W. S. TYLER COMPANY
CLEVELAND 14, OHIO
Manufacturers of Woven Wire Screens and Screening Machinery

Enter 233 on card, page 211

JOHNSON
MARCH ► chem-jet DUST CONTROL SYSTEM


COMPOUND M-R—powerful surface active agent, the basis for system's effectiveness.
CHEM-JET PROPORTIONER—automatically proportions M-R and water in ratio of 1 part M-R to 750 parts water.
SPRAY JET HEADER—carries series of spray jets. Jets are housed for protection and have large area strainers to prevent clogging.
SPRAY JET CONTROLLER—governs flow of solution to header. It is actuated by automatic control or manual operation.
CONTROL ACTUATOR—automatically transmits signal to controller when material is in position to be treated.

LOW COST:
Investment
Operation
Maintenance

typical users of Chem-jet Dust Control Systems:

- General Crushed Stone Co.
- Lambert Brothers Quarries
- Marquette Cement Co.
- Nello-Teer Co.
- Penn-Dixie Cement Co.

THIS is what makes Chem-jet Dust Control different from any other system:

Chem-jet solves your dust problem by preventing dust! It attacks dust at its source, allaying dust before it becomes airborne.

Chem-jet treats dust bearing materials with Compound M-R, an extremely powerful surface active agent developed by Johnson-March chemists. M-R confines and agglomerates dust, with as little as ½ to 1% moisture per ton of material.

Chem-jet saves you money through low cost installation, minimum maintenance, economical operation. It eliminates bulky hoods, ducts, fans, plus the extra trouble of collecting and disposing of dust.

Where dust is a community nuisance and an employee hazard, it will pay you to investigate low cost Chem-jet. Write today for Booklet CJ-1 to Johnson-March, 1724 Chestnut St., Philadelphia 3, Pa.

JOHNSON
MARCH **DUST CONTROL ENGINEERS**
1724 Chestnut Street, Philadelphia 3, Pa.

Enter 234 on card, page 211

Morris Machine Works, Baldwinsville, N. Y., manufacturer of heavy-duty slurry and dredge pumps, has appointed C. C. CARY and T. B. BRANN sales representatives for the

C. C. Cary

T. B. Brann

New York, northern New Jersey, and Long Island areas. Both men will headquarter in New York.

Mr. Cary, who joined the Morris sales engineering staff in 1953, has been affiliated with the company's New York office since 1956. Mr. Brann, has been associated with Morris export sales for the last several years.

George M. Philpott Company, Inc., San Francisco, Calif., has been appointed as a distributor for sales and service of products of the Koehring Division, Milwaukee, Wis. Equipment to be handled includes the full line of excavators, truck and cruiser cranes, and the Koehring *Dumptor*, an off-the-road hauling unit.

President of the distributing firm is George M. Philpott; general manager is J. Woodford.

Two new dealers for FWD transport tractors and ready-mix trucks have been appointed by Four Wheel Drive Auto Company, Cintonville, Wis.

They are the George Bock Company, Dubuque, Iowa, and the Silver Eagle Company, Portland, Oreg. The Bock organization will represent FWD in Clayton, Delaware, and Jackson counties of Iowa, Grant and Lafayette counties of Wisconsin, and Jo Daviess county of Illinois. The Silver Eagle Company's FWD territory includes all of Oregon plus Cowlitz, Clark, and Skamania counties of Washington.

(*Continued on page 242*)

Enter 235 on card, page 211 ➔

Digging iron ore on the Mesabi Range near Aurora, Minnesota.

MARION 151-M—Power For Unmatched Digging in Mines and Quarries

A Marion 151-M in action is a familiar sight in many parts of the iron range, in copper mines, coal pits and quarries throughout the world. This 7-yard machine is ruggedly built throughout with ample power for continuous, high-speed production. It is readily convertible to dragline service with boom lengths from 80′ to 120′ and buckets from 4 to 8 yards.

A 40-ton Marion 43-M truck crane loads 69,000 pounds at 13 feet. Such standard features as a torque converter, Marionair Control, power raising and lowering of the gantry and ballast give the operator big advantages. The strong, highly mobile carrier provides maximum maneuverability during travel and on the job.

Consult Marion Mining Specialists for lower costs on your property.

MARION

MARION POWER SHOVEL COMPANY—MARION, OHIO, U. S. A.

A Division of Universal Marion Corporation

PRODUCER

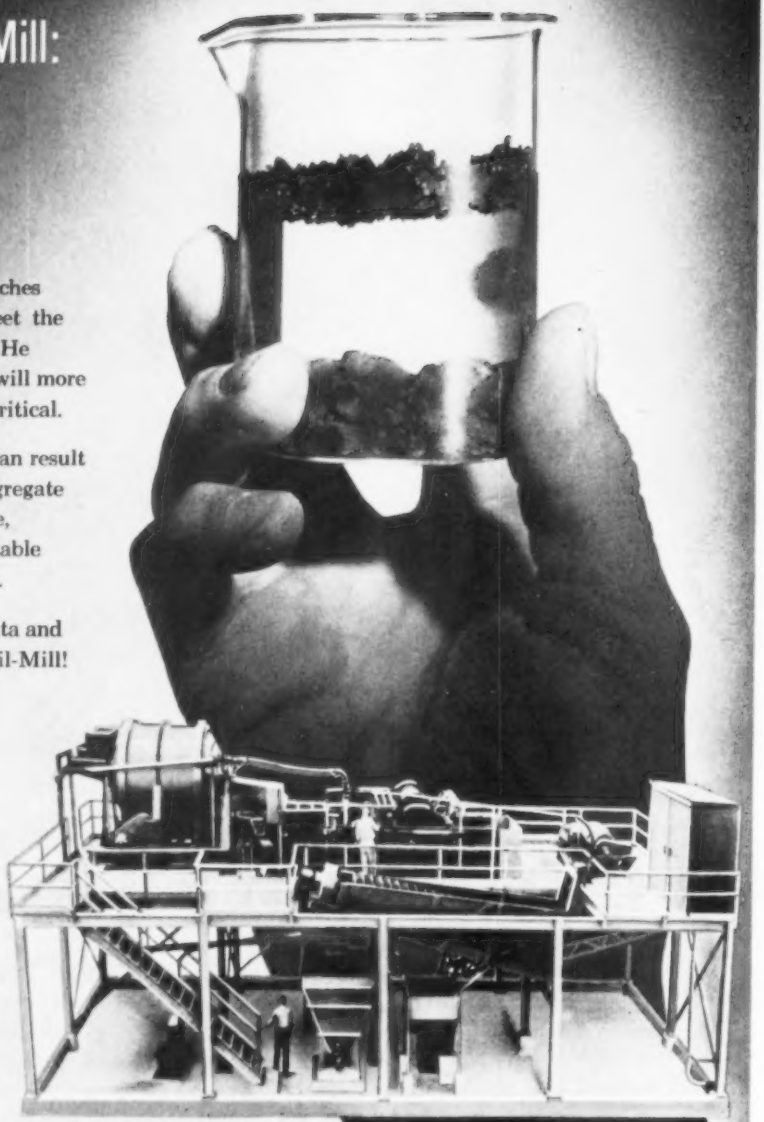
The Wemco Mobil-Mill:

Standard of the Aggregate Industry in Meeting Rigid Specifications with the Heavy Media Separation Process

The successful operator today reaches beyond the safety factor — to meet the toughest aggregate specifications. He protects himself with quality that will more than meet inspection — however critical.

Treatment of unusuable deposits can result in the production of a premium aggregate at surprisingly low cost. Coal, shale, chert, clayballs and other unacceptable materials are literally floated away.

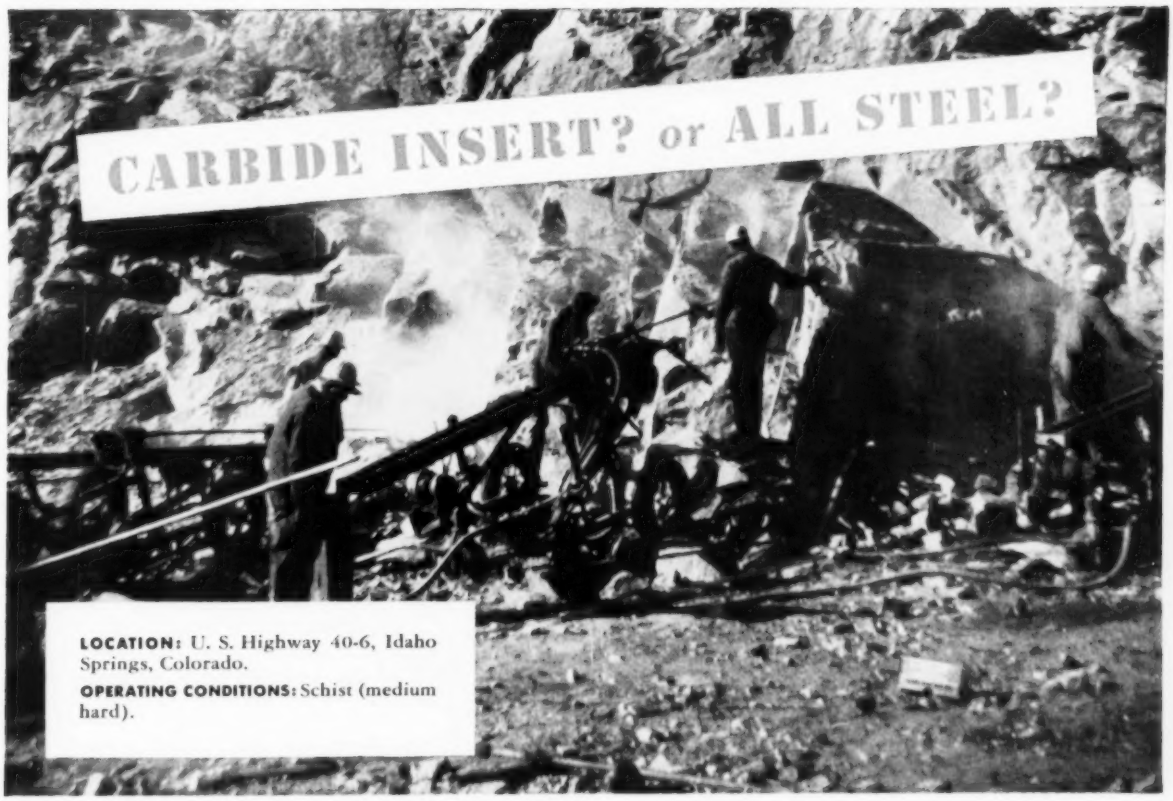
Get *all* the facts . . . documented data and costs . . . on the Wemco HMS Mobil-Mill!



Depend on the Wemco Mobil-Mill and the skills behind it.

WEMCO®

Western Machinery Company
650 Fifth St. • San Francisco, California
and throughout the world



"We get lower cost and uniform results with TIMKEN® carbide insert bits"

. . . Reports Z. H. Lowdermilk, Inc.

THE first Colorado link in the Transcontinental Superhighway—four lanes on U. S. 40-6 near Idaho Springs, Colo., — required drilling through schist. Z. H. Lowdermilk, Inc., report they get lower bit cost per foot-of-hole and consistent footage drilled with Timken® carbide insert bits.

On jobs like this, you can get maximum economies and best results using Timken carbide insert bits. But carbide insert bits are not always best in every case. In ordinary ground, Timken all steel multi-use bits save you the most. With correct and controlled reconditioning, they give you lowest bit cost per foot-of-hole when you can drill full increments of steel.

Whichever type you use, your drillers will save time. Timken carbide insert and all steel multi-use bits are interchangeable in the same thread series. Drillers can change bits right on the job without changing drill steels.

Both bits are made of Timken electric furnace fine alloy steel. We're the only American removable bit manufacturer that takes the extra quality control step of making its own steel. For further protection, Timken bits have a specially developed shoulder union that guards threads against drilling impacts.

To get the right and most economical bit for your job, call or write The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable: "TIMROSCO".

Timken threaded all steel multi-use rock bit

Timken threaded carbide insert rock bit

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

your best bet for the best bit for every job

Sauerman News Briefs

SPECIAL EDITION OF SAUERMAN NEWS

Brief items about the Sauerman Method... Crescent DragScrapers Slackline and Tautline Cableways... Durolite Blocks

Sauerman Bros., Inc. • 634 South 28th Avenue • Bellwood, Illinois, (Chicago Suburb)

4-YARD DRAGSCRAPER ELIMINATES A SHIFT AND UPS PRODUCTION

At the Union Sand and Gravel Co., a Sauerman DragScraper Machine gives Union the production necessary to supply increased plant demand in just one shift. Two shifts were required with their previous installation when a smaller Crescent and hoist were used.

The 4-yd. DragScraper delivers 175-cu. yds. or about 250 tph. when digging 400 ft. from the hopper. Power is supplied by a Sauerman three-drum hoist which has an inhaul speed of 500 fpm. with loaded bucket and a 1,000 fpm. backhaul speed. A 30-ft. tubular steel mast equipped with Durolite blocks forms the head end assembly. Operating cables from the hoist are reeved through the head end Durolites to the rapid-shifting tail bridle system 500 feet away.

A trolley and tail block travel the tail bridle cable. Lateral shifting of the trolley by the third drum changes the Crescent DragScraper's line of operation.

(Condensed from Sauerman News No. 144.)

How MAPCO Digs and Hauls at a Cost of 4 Cents per Ton

Mapco Sand and Gravel Co. is using a 2-yd. DragScraper to work their deposit at a cost of about 4 cents per ton. The company bases this figure on production of 235,000 tons and includes all labor, power, cable replacement and maintenance of hoist and blocks.

The DragScraper Machine is equipped with an electrically operated skid-mounted Sauerman hoist. Power is transmitted by V-belts. This new hoist replaced another Sauerman hoist that was in service for over 25 years.

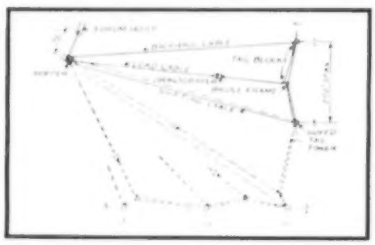
The Crescent DragScraper works the pit and bank face and delivers to a ground level hopper on an average haul of 450 ft.

(Condensed from Sauerman News No. 148.)

DragScraper Supplies Gravel for 82 Miles of Turnpike

More aggregate production was needed by Southern Michigan Materials, Inc. to supply structural and, upon completion, the maintenance and incidental needs for 82 consecutive miles of the Ohio and Indiana Turnpikes.

This demand was met with a new plant and a 5-yd. DragScraper which supplies gravel at the rate of about 275 tph. Digging goes to a depth of 75 to 80 ft. Power is provided by a Sauerman three-drum hoist driven by a 325-hp. diesel. The rapid-shifting bridle provides a means of changing the DragScraper's line of operation by placing the tail block attached to the bridle in another position along the 250-ft. span between the two steel tail towers.

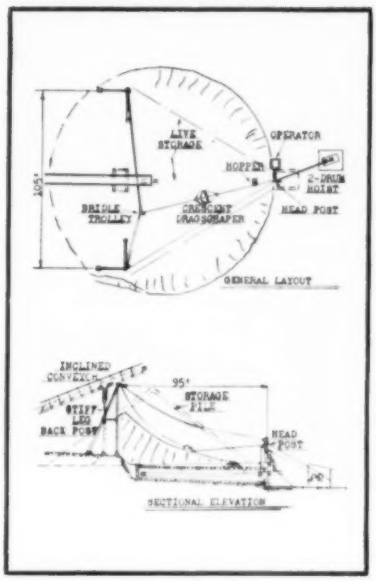


The hoist is pneumatically controlled by the operator from the hoist house. His location gives him excellent visibility of the entire pit and most of the plant.

The parent company, Northwest Materials, Inc., has completely excavated another pit nearby with a Sauerman 2-yd. Slackline Cableway. Northwest also uses a small scraper for stockpiling and reclaiming material from storage.

(Condensed from Sauerman News No. 145.)

Rapid Shifting DragScraper is Engineered to Needs of Silica Sand Producer



The Sauerman Method was successfully applied to the requirements of a prominent silica sand producer, as shown in the drawing above. This Rapid-Shifting DragScraper Machine reclaims raw sand from a 6,000-ton stockpile.

The pile is formed by an inclined conveyor leading from the floor of the quarry to the live storage area. The Crescent DragScraper reclaims from storage to a hopper-fed conveyor in front of the head post.

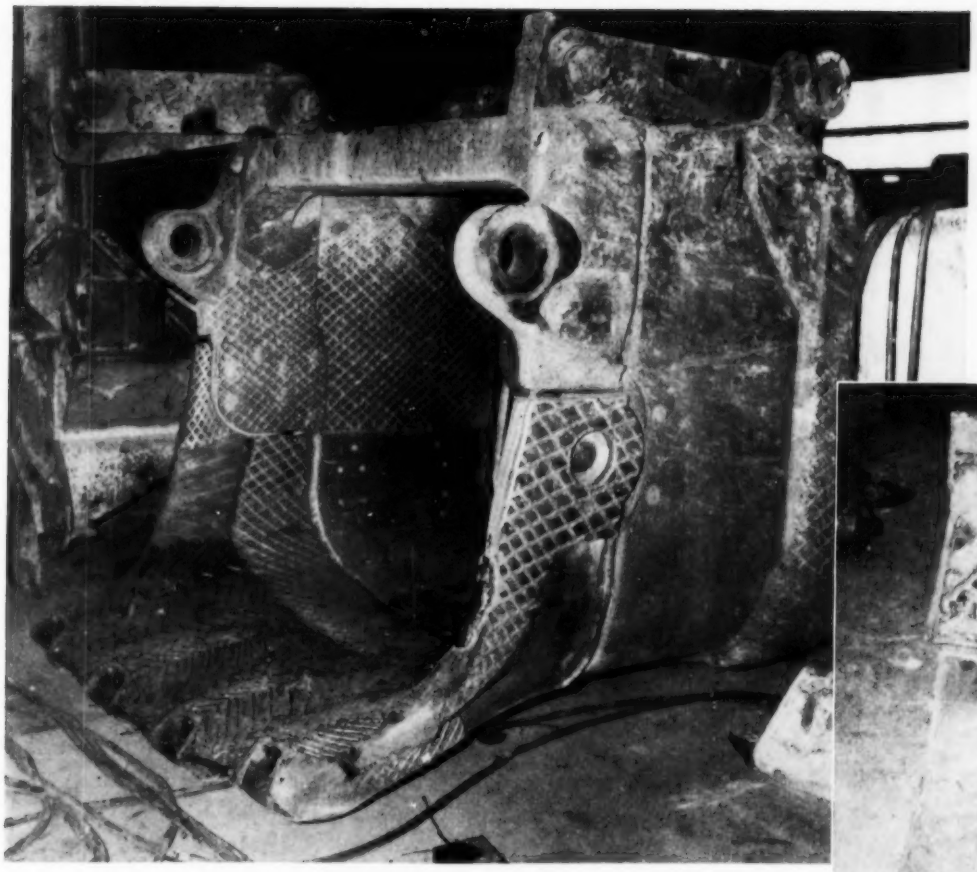
Before the DragScraper was installed, the raw sand frequently bridged across the hopper. Such interruptions in the flow of raw sand to the plant resulted in costly shutdowns. The Crescent prevents this bridging action and provides a steady flow of material for processing.

The Sauerman Method also permits the company to build up a reserve pile of raw sand sufficient for at least one week's production as insurance against a quarry shutdown.

(Condensed from Sauerman News No. 147.)

MORE NEWS AND INFORMATION

Issues of Sauerman News giving greater detail about the installations on this page are available on request. For full information, tell us your interest or requirements and ask for catalog. Contact Sauerman Bros., Inc., 634 S. 28th Ave., Bellwood, Ill.



BUCKET FRONTS, SIDES, BOTTOMS AND LIPS *are naturals for Semi-Automatic Hard-Facing. The large surfaces are covered faster and can be quickly touched up during short periods of downtime. Stoody 100, applied in various patterns, gives economical wear life.*

BUCKET TEETH AND ADAPTERS *are hard-faced with Stoody 100. Usually, stringer beads are applied counter to direction of material flow, with more effective wear resistance.*

Better wear protection, faster application on shovel parts *with STOODY SEMI-AUTOMATIC HARD-FACING!*

Hard-facing jobs that used to take hours can now be done in minutes. These tremendous time-savings are the result of Stoody Semi-Automatic Hard-Facing... a process that puts down 2 to 4 times more hard metal per hour than is possible by manual welding. Here's a way not only to cut maintenance costs, but to simultaneously lighten work loads on welding crews... provide more time to finish work that normally piles up—or never gets done!

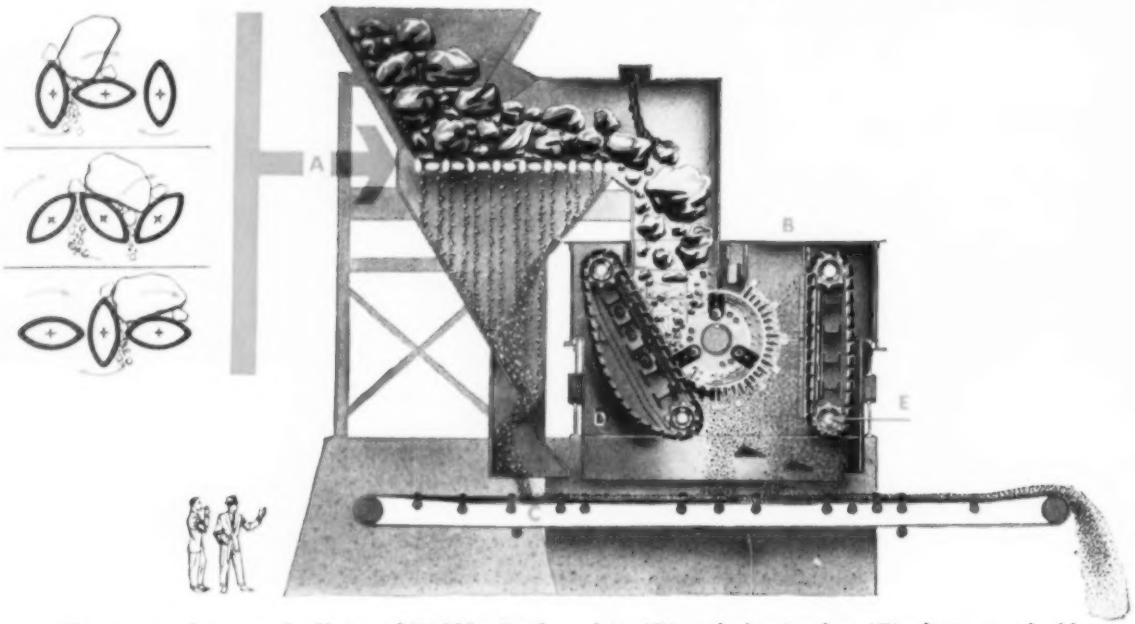
With Stoody's *complete line of alloys* in wire form for semi-automatic hard-facing, *an exact choice best suited for each wear problem is available.* Get the full facts on Stoody Semi-Automatic Wires and see how you can cut welding time, simplify maintenance and still obtain the same high wear resistance available in other Stoody Alloys.

TEST STOODY SEMI-AUTOMATIC HARD-FACING IN YOUR OWN PLANT—Arrange now for a personal demonstration with any Stoody Distributor. Check the Yellow Pages of your phone book or write direct.

STOODY COMPANY
11940 East Slauson Avenue
Whittier, California

new feeder-hammermill combination

makes possible 50 to 100% capacity increases



This new combination of a Universal Wobbler Feeder (patented) and a Bulldog Hammermill was engineered for one of the world's largest cement mills to average 600 tons per hour. Here's how it works . . . here's why it can boost capacity for you.

The Universal Wobbler Feeder (A) feeds the Bulldog Hammermill (B). Elliptical-shaped Wobbler bars are set in alternate vertical and horizontal positions to form the feeder bed. Turning of the bars imparts a rocking, tumbling motion to the load. Mud and clay are worked loose, fines sift through bars and drop to under-conveyor (C) oversize is delivered to the Hammermill. Wobbler operates on 15 to 25 h.p.

Bulldog Hammermills feature a traveling breaker plate (D) and cleaning bar (E) eliminating build up of material in breaking chamber. Regardless of moisture, a Bulldog Hammermill keeps your crushing operation going without clogging or jamming in wet, sticky material.

This is why you can increase your production up to 100%. The Wobbler Feeder sends only oversize to the Bulldog Hammermill. Thus, the Bulldog can handle more loads per day, produce more finished material. And you get double non-clog protection by the scalping effect of the Wobbler Feeder and the non-clog moving breaker plate on the Bulldog Hammermill.

Let our engineers show you how this combination can work for you. Write to

Subsidiary of
PETTIBONE
Mulliken Corp.

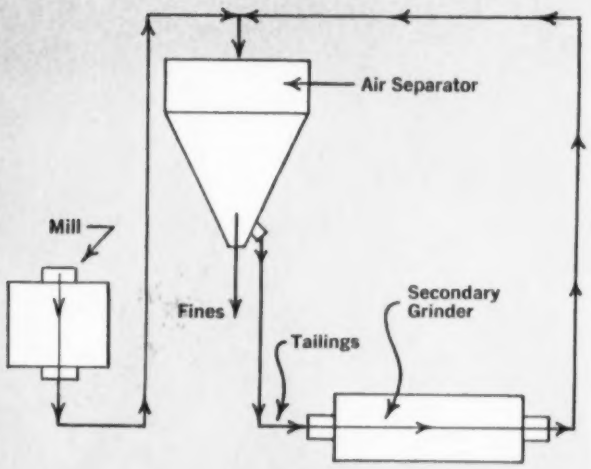
HAMMERMILLS, INC.
619 C Avenue, N.W., Cedar Rapids, Iowa

AUXILIARY EQUIPMENT:
- FEEDERS
- CONVEYORS
- SCREENS
- BINS

MANUFACTURED BY UNIVERSAL ENGINEERING CORPORATION

Stop Overworking Grinding Mills

FEED SPOUT
Sturtevant Air Separators come in 9 models, diameters range from 3 to 18 ft.
TAILINGS DISCHARGE
FINES DISCHARGE



Secondary grinder runs open, starting circulating load through air separator. Desired fines are discharged, and oversize is fed to ball mill and then returns to air separator for further classification.

LET STURTEVANT AIR SEPARATION HELP YOUR SYSTEM PRODUCE UP TO 300% MORE 40 TO 400 MESH FINES — CUT POWER COSTS AS MUCH AS 50%

Fines that pass through grinding mills unhindered, serving only to increase the work load, can be quickly classified by a Sturtevant Air Separator operating in closed circuit. With all oversize automatically returned for further grinding, the result is production capacity impossible to achieve in single-pass grinding — as well as a better, more uniform product.

Closed circuit grinding and air separation is of proved advantage in *all* secondary reduction processes. Grinding mills are free to perform at top efficiency, their output frequently increased as much as 300% and power costs cut up to 50% (documented by 30 years of Sturtevant air separation experience in the cement industry). Further, attritional heat is dissipated by greater surface exposure.

Sturtevant Air Separators Keep Grinding Units At Peak Efficiency — Classify Feed Loads to 800 Tons Per Hour

Sturtevant Air Separators circulate production loads with exact control of air currents and centrifugal force. Simple adjustments make possible counter-action between the two to the point where a product of almost any desired fineness may be collected while coarser sizes are rejected.

A 16 ft. Sturtevant, for example, took a feed rate of 800 tph, containing only a small percentage of desired fines, and delivered 30 tph 90% 200 mesh, recirculating the oversize through the grinding circuit. (In the cement industry, Sturtevant units deliver up to 60 tph raw cement fines, 40 tph finished cement fines.)

Sturtevant's ability to engineer precise, high capacity classification for closed circuit grinding systems is the result of long experience with a wide variety of dry processes. Sturtevant designed its first air separator some 40 years ago — and has been pioneering developments in centrifugal classification ever since.

Current users of Sturtevant Air Separators include manufacturers of sulfur, soybeans, phosphate, chocolate, feldspar, sand, pigments, limestone fillers, abrasives, plasters, ceramics and cement.

Designed for precise separation of all granular materials, Sturtevant Air Separators have been adapted to other materials as well. Johns Manville, for example, uses a 10 ft. model to separate 3 to 6% undesirable rock from asbestos.

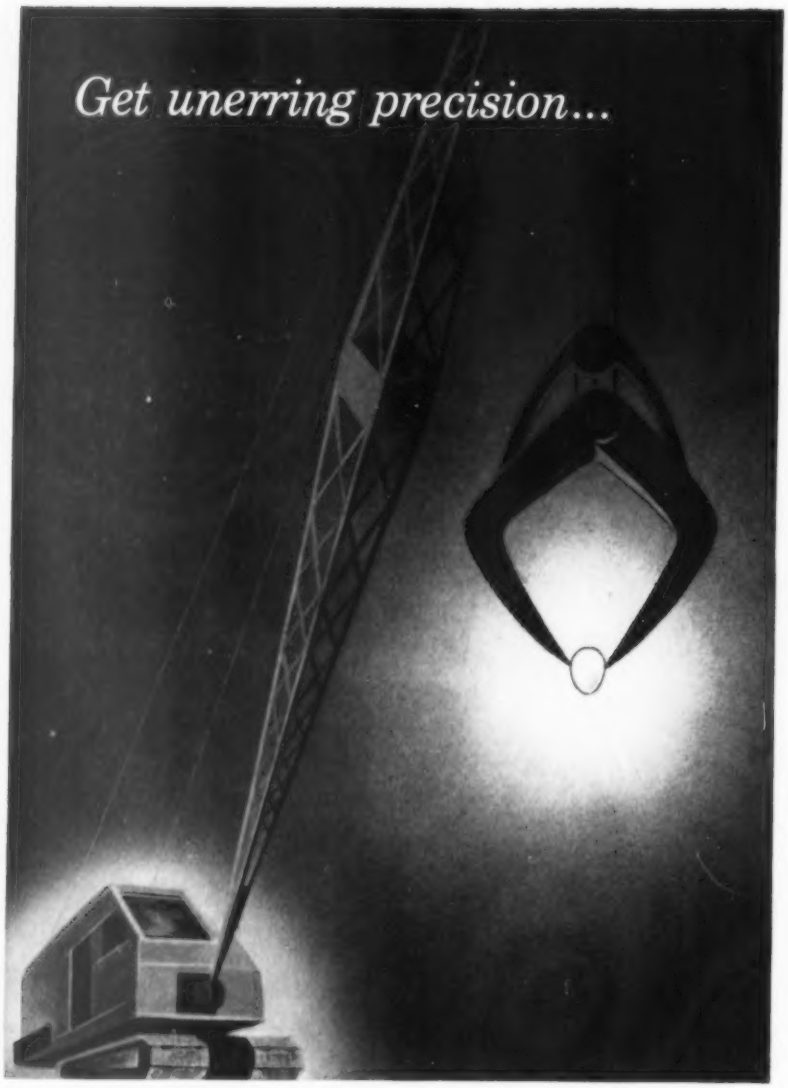
Ruggedly constructed, Sturtevant units are designed for minimum maintenance — at a Midwestern rock-crushing plant, a 10 ft. Separator operates outdoors year-round with only routine care.

For further information, request Sturtevant Bulletin No. 087. Write Sturtevant Mill Co., 104 Clayton St., Boston 22, Mass.

STURTEVANT

Dry Processing Equipment

CRUSHERS • GRINDERS • MICRON-GRINDERS
SEPARATORS • BLENDERS • GRANULATORS
CONVEYORS • ELEVATORS



that speeds payloads... with J-M Friction Materials

Riveting J-M woven lining to a hoist brake band.

You may never even try the egg-lift trick . . . but precision-engineered Johns-Manville Friction Materials *do* assure you of the positive control that speeds payloads on any type of job.

These job-proved friction materials are rugged and durable . . . designed to pay off in terms of more loads per hour in complete safety. And you can choose from a wide range of linings, blocks, facings, cones and segments that are standard equipment on leading makes of heavy-duty units. For the right material for your needs, see your Johns-Manville Distributor or write Johns-Manville, Box 14, New York 16, N.Y. In Canada: Port Credit, Ontario. Ask for Brochure FM 35-A.

JOHNS-MANVILLE

100 YEARS OF QUALITY PRODUCTS . . . 1858 . . . 1958

Enter 242 on card, page 211

Manufacturers' News

(*From page* 234)

ARCHIE LAIRD, formerly sales application engineer in the Detroit office of Vickers Incorporated, Detroit, Mich., has been appointed manager of the company's Atlanta office.

Mr. Laird has been with Vickers since 1952. For several years prior to that time he was a sales engineer with a power plant equipment manufacturer.

A. Laird

W. D. Stohlman

The Bemis Bro. Bag Co., St. Louis, Mo., has appointed W. D. STOHLMAN, manager of the Norfolk bag factory and sales division, to the newly-created position of midwestern representative of the Bemis Cotton Department.

L. H. GOFF JR., plant superintendent, will succeed Mr. Stohlman as manager at Norfolk.

Mr. Stohlman will be responsible for the sale and promotion of products manufactured by Bemis' cotton mills in Bemis, Tenn., and Talladega, Ala.

Arkell and Smiths, New York, N. Y., has re-elected SHELDON S. YATES as chairman of the board and has named ROBERT F. SEARLE, formerly vice-president in charge of manufacturing, president of the company. Mr. Searle joined Arkell and Smiths in 1948.

ROBERT B. WILBUR has been appointed southeastern division manager for manufacturer's sales by The General Tire & Rubber Company, Akron, Ohio.

Mr. Wilbur has been associated with the firm in various sales management capacities since 1947. Prior to his new assignment, he was sales manager for products of the company's Marion, Ind., plant.

"Not merely to sell; but to serve . . . not only to make good steel products; but to make them still better . . . not only to fulfill today's requirements; but to anticipate tomorrow's—these are the principles that constantly guide CF&I."

G. F. Franz
President

Grinding Mill Bulletin #2

This ad is directed to those grinding mill operators who are interested in increasing the efficiency and production capacity of their ball mills. It is presented by CF&I—in line with our policy *"not merely to sell; but to serve"*—in the hopes that it will add some new information on grinding procedures.

First Things First—Determine Best One Size Ball Makeup Charge

In the first article of this series, it was shown that determining the optimum size assortment of grinding balls for a makeup charge is a practical means of improving mill operation. Before an attempt is made, however, to work out a ration makeup charge, the best makeup charge of one size ball should be established.

Factors Determining Correct Ball Size Choice

Ball . . . 1) Specific Gravity (affected by voids in the ball); . . . 2) Shape; . . . 3) Homogeneity; . . . 4) Relative Cost of balls by diameter

Mill . . . 1) Inside Diameter; . . . 2) Speed (peripheral speed rather than percent of critical speed)

Manner of Operation (assuming one-stage grinding only) . . . 1) Open or Closed Circuit (percent circulating load of closed circuit); . . . 2) Mill Pulp Density (specific gravity of pulp constituents)

Feed Material . . . 1) Size Structure of Mill Feed; . . . 2) Desired Particle Reduction; . . . 3) Character of Ore, i.e. (a) Specific gravity of gangue and of mineral or minerals, and (b) Grindability characteristics (comminution to crystal sizes; comminution through crystal sizes; sliming characteristics)

Ball Makeup Charge of One Size, for a New Mill

Use all the tools at hand to determine the best one size ball makeup charge: laboratory tests of feed material, mathematical formulae, and recommendations from ball mill and grinding ball manufacturers. One's own experience, of course, is invaluable. Full confidence cannot be placed in mathematical formulae for they may not accurately take into account all the factors affecting the not-fully-understood, complex mechanics of ball mill grinding. Tests made with laboratory-size equipment can indicate grindability of ore, but such scale-size work has its limitations in that the ratio between mill diameter, mill peripheral speed, ball diameter and particle size obtained in laboratory is not the ratio that exists in the full-scale operation.

Character of Ore—So IMPORTANT!

When a new mining property is being developed, the ore body is often not accessible; so that sampling will not indicate all the types of ore that will eventually be encountered. It is important that the comminution problem of the various ores to be encountered be studied in terms of the subsequent metallurgical processes, both physical and chemical. The degree to which the ores will be blended before entering the ball mill should be taken into consideration.

If no blending or poor blending is anticipated, the most difficult grinding ore should be given the most weight in determining ball size, although this size may be too large for the softer ores.

Effect of Ball Size

Either too large or too small a ball size addition will result in decreased mill throughput and increased power consumption per ton of ore ground for ball mill operations in closed circuit. Under-size balls haven't the impact to break the larger particles effectively, adversely affecting subsequent mineral liberation. Over-size grinding ball addition results in the seasoned charge of fewer balls offering less surface for attrition grinding, thus giving too coarse a grind for efficient mineral liberation. The optimum one size ball addition is a "happy medium" between these two conditions.

The penalty for the use of too small a size ball addition is generally considered greater than for using too large a size ball, so the tendency is to favor the larger size.

CF&I grinding balls are available in diameters from 3/4" to 5", and are forged from special analysis steel. They are carefully inspected throughout production and immediately before shipment to make certain they have no surface pits, circumferential ridges or other surface unevenness. They are specified by many leading mill operators. Your nearest CF&I sales representative will be glad to give you complete details.

Indications of wrong size balls used in makeup charge in an operating mill will be discussed in the next article in this series on ball rationing.

For a reprint of the article on which this ad is based, please write on your company letterhead to: Mining Supply Department, The Colorado Fuel and Iron Corporation, P. O. Box 1920, Denver, Colorado.

OTHER CF&I STEEL PRODUCTS FOR THE CEMENT INDUSTRY

CF&I Grinding Rods · CF&I Grader Blades · CF&I Industrial Screens
CF&I Mine Rail and Accessories · Wickwire Rope · CF&I Rock Bolts

FORGED STEEL GRINDING BALLS
THE COLORADO FUEL AND IRON CORPORATION

5823-A

Albuquerque · Amarillo · Atlanta · Billings · Boise · Boston · Buffalo · Butte · Chicago · Denver · Detroit · El Paso · Ft. Worth · Houston
Kansas City · Lincoln (Neb.) · Los Angeles · New Orleans · New York · Oakland · Oklahoma City · Philadelphia · Phoenix · Portland
Pueblo · Salt Lake City · San Francisco · San Leandro · Seattle · Spokane · Wichita

Atlas Powder Company, Wilmington, Del., recently dedicated its new Technical Center in a short ceremony at the company headquarters in suburban Wilmington. The $3,000,000 facility, located next to the company's general office which was opened three years ago, will house the company's basic research and chemical product development activities.

WILLIAM ROESCHEN has been appointed chief engineer of the Highway Equipment Company, Cedar Rapids, Iowa.

GEORGE R. NIELSON, former vice-president of F. L. Smidth & Company, New York, N. Y., passed away on May 25, 1958, in Bronxville, New York. Mr. Nielsen was born in Denmark on August 31, 1885.

In 1907 Mr. Nielsen came from Denmark to the United States, where he joined F. L. Smidth & Company as an engineer. In 1940 he was elected vice-president of the firm, and held this position until his retirement from F. L. Smidth & Company in 1953.

GOT WATER?

GET FLYGT

...THE 24-HOUR PUMP

Reasons for the world-wide success of FLYGT B-80L pumps:

Electric, fully submersible, fully portable (185 lbs)
Instant pumping — no priming, no installation
Runs dry without damage
Takes high proportion of solids
Practically no maintenance or supervision
Frost- and fire-proof
6 hp, 3" hose, 330 GPM, max. head 170 ft.

Also: *FLYGT B-38L — 1.8 hp, 75 GPM, 70 lbs, max. head 90 ft., 1½" hose; FLYGT B-80 Marine—6 hp, 330 GPM, max. head 145 ft., 3" hose; FLYGT B-150/200L — 65 hp, 3,000 GPM, max. head 220 ft., 6" or 8" hose, 1200 lbs. Higher heads with FLYGT pumps in tandem.*

(CLIP AND ATTACH TO YOUR LETTERHEAD)

East of the Mississippi:
STENBERG MANUFACTURING CORPORATION
Hoosick Falls, N.Y.

West of the Mississippi:
Stanco MFGS & SALES INC
1666 Ninth St., Santa Monica, Calif.

Please rush full information on FLYGT pumps.
Required capacity: GPM at ft. head.
Signature:
SOME DISTRIBUTORSHIPS STILL AVAILABLE

Enter 244 on card, page 211

E. N. Kunkle

R. W. Reedy

EARL N. KUNKLE has been elected a vice-president of the Kennedy-Van Saun Manufacturing & Engineering Corporation of New York and Danville, Pa., and RICHARD W. REEDY has been named assistant vice-president.

Mr. Kunkle, who has been affiliated with Kennedy-Van Saun since 1930 in various sales field and production department positions, is now heading the corporation's cement plant division.

Mr. Reedy joined Kennedy-Van Saun in 1945, and has served in the sales department and as assistant to the president.

The Euclid Division, General Motors Corporation, has appointed Pace-Euclid, Inc., Kansas City, Kans., as authorized dealer for the complete line of Euclid equipment.

The territory of this new distributor consists of the Kansas counties east of and including Marshall, Riley, Geary, Wabaunsee, Osage, Coffee, Woodson, Wilson, and Montgomery, plus the Missouri counties west of and including Putnam, Sullivan, Linn, Chariton, Howard, Cooper, Moniteau, Morgon, Camden, Laclede, Webster, Christian, and Taney.

Appointment of J. E. CARR as manager of the industrial division of The Oliver Corporation, Chicago, Ill., with headquarters at the company's Cleveland plant, has been announced. Mr. Carr is a veteran of 29 years in Oliver's sales organization, most recently as manager of the company's Des Moines sales branch.

In his new capacity, Mr. Carr will direct all sales activities in the United States and Canada for the company's full line of industrial crawler and wheel tractors, and allied equipment.

TRUE
WHAT ARE YOUR ^ BLASTING COSTS?

Get a complete profit picture with new, free Blasting Cost Chart! Let the Atlas Man show you how

Explosives costs alone don't always determine value of a blast. The explosives used have a direct effect on drilling, digging, hauling and crushing costs. Now, a free, simplified computing method—developed by Atlas, gives you a true, complete cost analysis of profits, without involved bookkeeping.

The Atlas Blasting Cost Chart enables you to protect or improve your profits. What's more, it's yours without cost and you can keep your figures confidential. The Atlas representative nearest you will be glad to show you how it works—without obligation.

EXPLOSIVES DIVISION
ATLAS POWDER COMPANY
WILMINGTON 99, DELAWARE *offices in principal cities*

"THIS LUBRICANT MEETS OUR REQUIREMENTS FOR SUB-ZERO TEMPERATURES"

Says- TUCKER SNO-CAT CORP.

"We are proud to state that there are over 50 SNO-CATS satisfactorily operating in the Antarctic in temperatures as low as minus 60 degrees. This seems to us the ultimate in extreme tests for both SNO-CATS and LUBRIPLATE LOW-TEMP Lubricant on which SNO-CATS depend for their consistently outstanding and reliable performance."

J. M. Tucker, General Manager

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE GREASE AND FLUID TYPE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE COSTS.

LUBRIPLATE is available in grease and fluid densities for every purpose . . . LUBRIPLATE H. D. S. MOTOR OIL meets today's exacting requirements for gasoline and diesel engines.

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK" . . . a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

Enter 246-A on card, page 211

The Jeffrey Manufacturing Company, Columbus, Ohio, announces three promotions within its sales organization.

ROBERT J. BRADY has been named manager of the Chicago district office, replacing James Green, who has resigned. Mr. Brady previously was district manager in Jacksonville, Fla.

Named to take charge of the Jacksonville office is WILLIAM A. LEWIS, who transfers from Houston, Tex.

ROBERT D. PRUSHING has been promoted to manager of the distributor sales department at the home office in Columbus. He was formerly assistant manager.

Link-Belt Speeder Corporation, Cedar Rapids, Iowa, a subsidiary of the Link-Belt Company, is constructing a new plant in Woodstock, Ont., to manufacture power cranes, shovels, and draglines.

The plant will be constructed and operated by Link-Belt Speeder's new Canadian subsidiary, Link-Belt Speeder (Canada) Ltd. When completed in November, the plant will consist of two crane bays comprising some 32,000 sq. ft. of space. It has been designed so that it may become the first section of a larger, fully integrated plant when future expansion is required.

L. R. KENT of the Bailey Meter Company, Cleveland, Ohio, has been appointed resident engineer in charge of the Richmond, Va., office. Mr. Kent is also resident engineer in charge of the Baltimore, Md., office. Both offices are subdivisions of the Philadelphia district.

Expansion of its utility tractor business is announced by Allis-Chalmers Manufacturing Company, Milwaukee, Wis., with the appointment of J. D. MORRIS as sales manager of the new Utility Tractor and Equipment Sales Department.

Utility products will be sold through dealers in the Construction Machinery, Engine-Material Handling, and Farm Equipment Divisions of the company.

J. D. Morris

C. E. Sartwell

The election of CLINTON E. SARTWELL as vice-president and director of engineering for Oshkosh Motor Truck, Inc., Oshkosh, Wis., has been announced.

Mr. Sartwell has been chief engineer for Oshkosh since 1934, and has been responsible for the engineering and development of heavy-duty all-wheel drive trucks.

JOHN W. VANCE, formerly assistant director of public relations for the International Harvester Company, Chicago, Ill., has been appointed director of public relations.

Mr. Vance joined International Harvester in 1938 as a member of its public relations group, and in 1941 was appointed assistant director of public relations.

Makes Difficult Fine Mesh Screening Easy

The Leahy® heated screen is unsurpassed for screening difficult, damp materials such as lime, ag lime or silica sand. Combining exclusive Differential Vibration with FlexElex® heating of the jacket, the Leahy Screen is engineered for continuous, accurately sized full capacity production. FlexElex heating is not an attachment. It is a fully integrated component of utmost efficiency. Send for Bulletin 16-EH.

Made by the Original Deister Company Established 1906

THE DEISTER CONCENTRATOR COMPANY

911 Glasgow Avenue, Fort Wayne, Indiana

Enter 246-B on card, page 211

ENDS MESS AND WASTE

NEW SINCLAIR LITHOLINE MULTI-PURPOSE GREASE CARTRIDGE

EASIER, FASTER, CLEANER LUBRICATION FOR CONTRACTORS

There's no mess, no spilling, no waste in filling your grease guns—when you use the new Sinclair LITHOLINE Multi-Purpose Grease Cartridge. Takes only seconds to pop a cartridge into the gun—and you're ready to lubricate. Fits all regular cartridge type guns.

Use Sinclair LITHOLINE for grease fittings on your equipment. It provides full protection against wear, rust, water—"stays put" under all conditions.

A Sinclair Lubrication Engineer will be glad to show you how the new Sinclair LITHOLINE Multi-Purpose Grease Cartridge can help *you*. Call your nearest Sinclair Representative, or write Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y. *There's no obligation.*

SINCLAIR LITHOLINE®

MULTI-PURPOSE GREASE CARTRIDGE

STARSTEEL
HEAVY DUTY SPACE SCREENS

In many cases, the life of STARSTEEL Screens is more than double ordinary screens! The wear-resistant high-carbon STARSTEEL wire is specially made to take the brutal pounding and abrasion of the most rugged screening jobs with minimum wear.

Another reason Star Screens stand up better is the greater precision in weaving—the freedom from buckling and distortion—the absolutely square, accurate hook ends or strips that guarantee tighter, more uniform tension and longer service. The tougher the job, the more you'll appreciate STARSTEEL Screens!

Most weaves and sizes ready to ship. **Ask for catalog.**

Star will produce screens or cloth from stainless or other steel alloys, Monel, brass, bronze, copper, aluminum or any metal that can be drawn into wire. Inquiries invited.

STAR
WIRE SCREEN & IRON WORKS, INC.
2515 San Fernando Road • Los Angeles 65, Calif.

Subsidiary of Ludlow-Saylor Wire Cloth Company, St. Louis, Mo.

Enter 248-A on card, page 211

FARRELL-CHEEK
ELEVATING and CONVEYING PARTS
. . . for Outstanding Performance Under the Most Severe Conditions

F85 FC

F85 ALLOY, HARD EDGE AND CARBON ELECTRIC FURNACE STEEL CASTINGS

WRITE TODAY FOR CATALOGS NOS. 21 and 23

FARRELL-CHEEK
STEEL COMPANY
SANDUSKY, OHIO, U. S. A.

BUCKETS • SPROCKETS • CHAIN • WHEELS • GEARS • SHEAVES • CABLE FITTINGS • BAR BENDERS, CUTTERS • R. R. CASTINGS • FIRE TOOLS, ETC.

Enter 248-B on card, page 211

Gardner-Denver DH-143

Gardner-Denver Rotary 600

Pace Setters for Open Pit Production... Gardner-Denver Quality Drilling Equipment

For Blast Hole Drilling

SUPER 5½" DH143 CRAWLER DRILLS—self-propelled heavy-duty drill. Packs plenty of deep hole punch in all formations.

DELUXE "AIR TRAC"® CRAWLER DRILLS—all controls for drilling, drill positioning and crawler drive are centralized for ease of operation. Available with 4" or 4½" drills. Also "Air Trac" without remote controls.

NEW GARDNER-DENVER "MOLE-DRIL"*—for use with rotary rig. An in-the-hole drill in two models for drilling 4¾" and 6½" hole in hardest rock.

WAGON DRILLS—light- and heavy-duty for every need.

AUGER DRILLS—both wagon drills and "Air Tracs" can be equipped with rotary motor for auger drilling.

QUARRY DRILLING AND BROACHING DRILLS.

DEEP HOLE DRILLS, DRIFTERS AND SINKERS—a complete line.

AIR FEED LEG DRILLS—and air feed legs for sinker mounting.

DRILL FEEDS AND CONTROLS—to fit every drilling job.

For Quality Drill Steel . . .

SECTIONAL DRILL RODS—highest quality—shot-peened and carburized to stand down-the-hole gaff longer.

RING SEAL SHANKS—replaces old-type water swivel without adding additional length to drill.

COUPLINGS—extra long threads—made for longer drilling life.

For Air Power . . .

GARDNER-DENVER ROTARY PORTABLE COMPRESSORS—five models that offer water-oil cooling for all-weather operation, "THRIFTMETER"® fuel control, easy-to-get-at parts for speeding maintenance, clutch that eliminates cold-weather dry compressor starting. Sizes from 125 cfm. to 900 cfm.

STATIONARY AND SKID-MOUNTED COMPRESSORS—eight compact WB compressor packages that deliver continuous trouble-free performance. Water-cooled. Combination radiator-intercooler saves cooling water. Sizes from 1150 cfm. to 142 cfm.

For Building Your Own Jumbo . . .

JUMBO COMPONENTS—for tractor and truck mounting or building your own jumbo.

DRILL POSITIONERS—provide hydraulic swing and dump on end of booms for drill and feed positioning.

HYDRAULIC BOOMS—powered by creep-free hydraulic cylinders that operate at low pressures.

HYDRAULIC REMOTE CONTROLS—for remote-control operation of drills, feeds, drill positioners and booms from any centralized position.

Plus . . .

Bit Grinders • Centrifugal Pumps • Air Hoists • Drill Steel Shapers • Sump Pumps • Air Maintenance Tools Oil Forges • Air Line Oilers • Air Motors • Breakers Tampers

*Trade-Mark

ENGINEERING FORESIGHT—PROVED ON THE JOB
IN GENERAL INDUSTRY, CONSTRUCTION, PETROLEUM AND MINING

GARDNER - DENVER

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

WILLIAM D. BICKEL was recently elected a vice-president of the Dravo Corporation, Pittsburgh, Pa., and was appointed general manager of the Machinery Division.

Manager of the division's Engineering and Construction Department since 1956, Mr. Bickel started with Dravo in 1936 as a sales engineer. He has held numerous other engineering and supervisory posts.

Promotion of BILL TALMAGE to the position of general industrial sales manager for Massey-Ferguson Industrial Division, Wichita, Kans., has been announced.

Mr. Talmage, formerly central regional industrial sales manager for the industrial division, had 20 years of experience in sales on the retail and wholesale level. Headquartering in Wichita for the M-F regional assignment, he headed sales operations across approximately the central third of the United States for the newly-created industrial division.

WILLIAM D. LEASE was elected executive vice-president and a director of the Athey Products Corporation, Chicago, Ill.

In his position as vice-president of sales, to which he was named in 1954, Mr. Lease was in charge of the company's sales efforts throughout the world.

EARL A. FRAZIER has been appointed Seattle district sales manager for the Wire Rope and Aircord Division of John A. Roebling's Sons Corporation, Trenton, N. J.

Mr. Frazier has been associated with Roebling since 1938, and has

E. A. Frazier

J. P. Kadlic

served as national field representative, and later as head of the Cleveland district office. Prior to his present assignment, Mr. Frazier was in charge of wire rope sales in the New York and New England area, with headquarters in New York City. His new territory includes Oregon, Washington, Idaho, and most of Montana.

Mr. Frazier is succeeded as New York district sales manager by JOHN P. KADLIC. Mr. Kadlic has been associated with the Roebling Corporation since 1947, starting as a sales representative in the St. Louis area. For the last seven years he has been in charge of the firm's wire rope sales in the Philadelphia district.

ROBERT D. O'BRIEN has been promoted to the position of vice-president-sales of the Pacific Car and Foundry Company, Seattle, Wash. Mr. O'Brien has been vice-president and general manager of the firm's Kenworth Motor Truck Company Division since 1956.

At the same time, it was announced that ROBERT C. NORRIE, chief engineer at Kenworth, has been appointed general manager of Kenworth Motor Truck Company, and that WALLACE M. BROWN has been named chief engineer at Kenworth.

Mr. O'Brien will continue to make his headquarters in Seattle. In his new position, his responsibility will be primarily to integrate the over-all sales efforts of Pacific Car and Foundry Company, including the co-ordination of sales of highway and off-highway trucks of the Kenworth operations in Seattle and Vancouver, B. C., and of the newly formed KW-Dart Truck Company in Kansas City, Mo.

ROBERT G. BURSON has been named assistant general sales manager for the Mechanical Goods Division of the Dayton Rubber Company, Dayton, Ohio. Mr. Burson will help co-ordinate sales, distribution, and merchandising programs for the company's entire mechanical line.

ALL BALLED UP?

Unload Your Surplus Equipment

by advertising in

PIT & QUARRY'S

Broadcast Section

For rates and information write:

PIT & QUARRY PUBLICATIONS, INC.

431 SOUTH DEARBORN STREET **CHICAGO 5, ILLINOIS**

SKF engineering solves major bearing problems

NEW SPHERICAL ROLLER BEARING SOLVES PROBLEMS OF HIGH LOADS, SPEEDS, AND ECCENTRICITIES IN VIBRATING SCREEN OPERATION

Vibrating screens give bearings a strenuous workout. They subject them to heavy loads, high speeds and eccentric motion.

To overcome these problems, SKF has developed a *new spherical roller bearing for vibrating screens in the mining, quarrying, chemical, steel and paper industries.* It's designed to—

New Series 4523 Screen Bearing

1. PROVIDE GREATER LOAD-CARRYING CAPACITY. It gives an average rating increase of 37% and 2.85 times longer fatigue life than the original spherical roller bearing. These increases are obtained by utilizing longer rollers (Fig. 1), closer conformity of roller contour to ring contour.

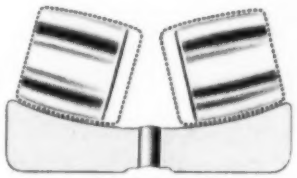


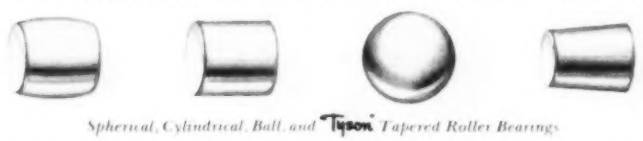
Fig. 1

2. OPERATE AT COMBINED HIGH ECCENTRICITY AND SPEED. This new bearing is equipped with a cage that withstands the stresses and wear caused by combined high operating speeds and by loads resulting from increased eccentric motion of the bearing.

So in this new bearing, SKF uses a cage made of centrifugally cast bronze having axially drilled and reamed pockets of a shape that conforms closely to the rollers' shape. Its spherical O.D. conforms to the contour of the outer ring sphere. It is symmetrical and made in one piece for dynamic stability. Thus, the cage is centered on large areas of contact located where effective lubrication is assured.

Centrifugally cast machined bronze cage

The new SKF Screen Bearings conform to SKF 223 Series Spherical Roller Bearing dimensions. For details on the sizes available, call your nearest SKF sales office or authorized SKF distributor. Write for Bulletin 466—"SKF Screen Bearings to Meet the Needs of Vibrating Screens."



Spherical, Cylindrical, Ball, and "Tyson" Tapered Roller Bearings

EVERY TYPE · EVERY USE

SKF®

SKF INDUSTRIES INC., PHILADELPHIA 32, PA.

REG. U.S. PAT. OFF.

NEW
ROTO-GUARD*
SHAFT MOTION INDICATOR

Connects to rotating shaft

Actuates warning lights or other signals. Operates control switches.

PROVIDES positive indication of drop in speed or stopping of machinery

PROTECTS conveyors • elevators • feeders • belt conveyors

OPERATING SPEEDS of 10 to 150 rpm make the **ROTO-GUARD** applicable to automatic protection of slow-moving machinery used in material handling and similar systems

RUGGED AND COMPACT: approx. 5" x 6" x 6".

SIMPLE • POSITIVE • RELIABLE • LOW COST

A Development of

THE BIN-DICATOR COMPANY

13946-T Kercheval • Detroit 15, Michigan

Specialists in Automatic Control Devices for Material Handling Systems for Over 20 Years

*TRADE MARK

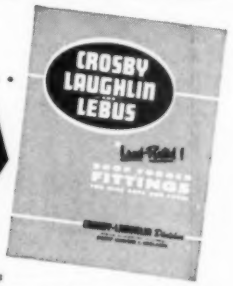
Write for Bulletin RG-16

WE SELL DIRECT • PHONE ORDERS COLLECT

Enter 252-A on card, page 211

FREE NEW CATALOG

LISTS More Products... More Data in the new CROSBY-LAUGHLIN



"LOAD RATED"* FITTINGS LINE

The world's most complete line of drop forged fittings for wire rope and chain

Detailed capacities, specifications and dimensional data are contained in this catalog listing over 2000 items. This complete data is directly transferable to your standards books.

For all lifting jobs "Load Rated" Fittings—featuring new alloys and a broader range of sizes—offer higher, guaranteed capacities with the safe working load permanently forged on every item. You're sure of getting *genuine* Crosby-Laughlin* Fittings because they're now painted RED—the color long identified with famous Crosby Clips and Blocks. Get this catalog that lets you order hooks, shackles, other fittings the *safe way—by capacity*, from mill supply, industrial or construction equipment distributors—or write direct to: *Trademark

CROSBY-LAUGHLIN *Division*

American Hoist and Derrick Company

FT. WAYNE 1, INDIANA

Enter 252-B on card, page 211

STILL AVAILABLE!

Pit and Quarry's BRAND NEW

Portland Cement and Lightweight Aggregate Plant Maps

Cement maps may be purchased for the following prices:

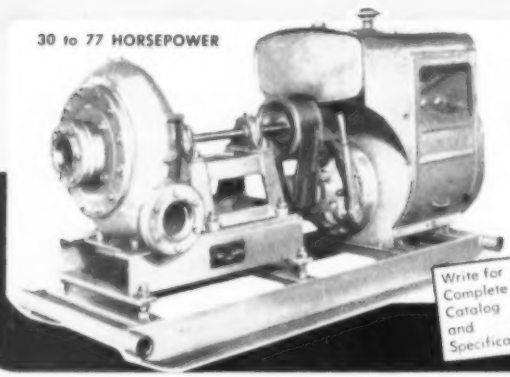
1 — 10	$1.00 each
11 — 25	.75 "
over 25	.50 "

Aggregate maps may be purchased for the following prices:

1 — 10	35¢ each
11 — 20	30¢ "
over 20	25¢ "

PIT & QUARRY PUBLICATIONS, INC. 431 S. Dearborn St. Chicago 5, Illinois

30 to 77 HORSEPOWER



Write for Complete Catalog and Specifications

NEW *Lightning* PORTABLE

SAND & GRAVEL PUMPS

4 AND 6 INCH SIZES

New design for a wide variety of uses and pumping conditions. 4-inch pump has 30 H.P. air-cooled engine; 6-inch pump has 6-cylinder radiator cooled engine. All wearing parts are of Hi-Chro-Hi, a super hard, abrasion resisting semi-steel. Maintenance is negligible, parts replacement is simple.

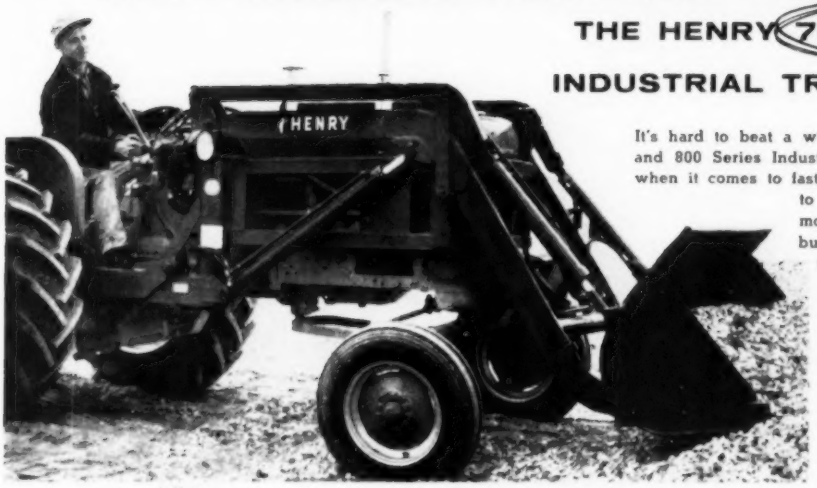
KANSAS CITY HAY PRESS CO.

Manufacturers of Heavy-Duty Lightning Sand and Gravel Pumps

801 WOODSWETHER ROAD • KANSAS CITY, MISSOURI

NEW NUMBERS THAT ARE HARD TO BEAT!

THE HENRY 700 & 800 SERIES INDUSTRIAL TRACTOR SHOVELS



It's hard to beat a winner . . . and the new HENRY 700 and 800 Series Industrial Tractor Shovels win every time when it comes to faster more economical operation. Made to fit a wide variety of popular tractor models . . . with their self-leveling bucket and float position in the control valve, they feature a higher dumping height of 8'6", maximum bucket rollback of 30°, and a maximum dump angle of 58°. All cylinders are large bore, double-acting, heavy-duty, and honed to micro finish. You can be sure you'll be dollars and days ahead on any tough job with one of these new HENRY Industrial Tractor Shovels.

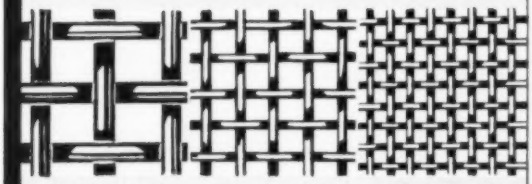
HENRY MANUFACTURING COMPANY, INC. TOPEKA, KANSAS

COAST TO COAST SALES & SERVICE

Sold and serviced by equipment dealers everywhere who sell quality . . . not price alone!

Enter 253-A on card, page 211

STRONG AS ARMOR
NAT-ALOY
Woven Wire Screens



Reliable Nat-Aloy woven wire cloth is specified throughout industry for maximum screening accuracy and economy. Available in flat surface, lock crimp, double crimp, rectangular and long slot openings. All sizes, meshes and gauges—prompt shipment.

WE OFFER NOW . . . SUPER NAT-ALOY
OIL TEMPERED WOVEN WIRE CLOTH

- ★ GREATER RESISTANCE TO ABRASION
- ★ MORE TONNAGE AT LOWER COST
- ★ FEWER COSTLY CHANGE OVERS

Write for information. Also stainless steel wire screens.

NATIONAL WIRE CLOTH COMPANY
252 W. Fairfield Ave., St. Paul 1, Minnesota

Enter 253-B on card, page 211

Check JOHNSON wide-rehandling clamshells

All-welded, smooth, fast-cleaning

Light-weight, sturdy, Johnson wide-rehandling clamshells assure big payload performance in loose materials. Big-diameter sheaves, with sealed-in needle bearings, reduce friction loss, deliver full digging power to the cutting lips. Hard manganese cutting edge, welded to lips, toughens with use. Wide-rehandling clamshell is available in 10 sizes from ¾ to 3 cu. yds. Other clamshells in Johnson line include general-purpose, and heavy-duty-digging types.

mail to: **C. S. JOHNSON CO.,** CHAMPAIGN, ILLINOIS *(Koehring Subsidiary)*

Send more information on _____ cu. yd. wide rehandling clamshell bucket

NAME _____

COMPANY _____

STREET _____

CITY, STATE _____ J 418 PO

Enter 253-C on card, page 211

ROBERT S. STEVENSON

Portrait by Fabian Bachrach

"At Allis-Chalmers we believe that we can do our fellow-employees no greater favor than to recommend that they invest in a 'nest-egg' fund of U.S. Savings Bonds.

"While this program has been going on for many years—made easy through the Payroll Savings Plan—we recently offered all Allis-Chalmers people a chance to review their individual bond purchasing schedules and to bring them up to date.

"As a result, more than 52% of the total Allis-Chalmers organization of about 40,000 people are buying U.S. Savings Bonds at a rate of approximately $6,000,000 a year."

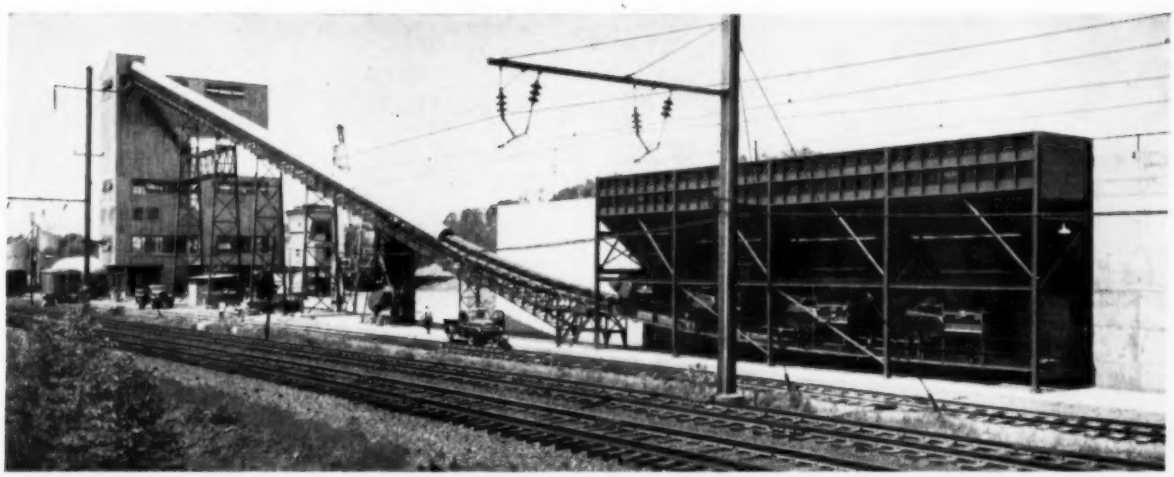
ROBERT S. STEVENSON, *President*
Allis-Chalmers Manufacturing Company

Start your employees on the path of future financial security through automatic savings in the new and improved Series E Savings Bonds. It's simplicity itself. Just contact your State Director, U.S. Savings Bonds Division. He'll provide all the material and assistance you need to install a Payroll Savings Plan or build enrollment in one already existing. Look him up in the phone book or write for full information to the U.S. Savings Bonds Division, Treasury Department, Washington, D.C.

The United States Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

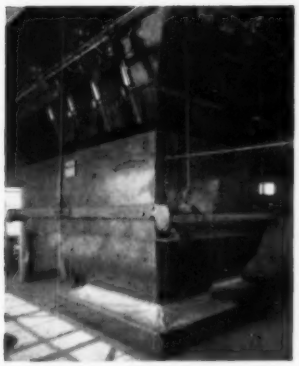
PIT & QUARRY PUBLICATIONS, INC.

TODAY—PAYROLL SAVINGS ENROLLMENT IS AT A NEW PEACETIME PEAK!



NEW FULLY-AUTOMATIC CENTRAL-MIX PLANT OF J. D. M. MATERIALS CO., INC., SOUTHAMPTON, PA.

- - DESIGNED AND BUILT BY FANNING-SCHUETT



This batcher has 6½ cu. yd. capacity and is fed from overhead bins through gates each operated by its own air cylinder and solenoid.

Latest design "wrap" type drive allows 270° utilization of drive pulley. All machinery is at ground level for easy service. Air tight casing houses roller chain drive to main pulley.

The new central-mix concrete plant of J. D. M. Materials Company, Inc., Southampton, Pa. is one of the country's outstanding examples of automation applied to the cement and concrete industry. Not only the batching equipment and storage bins, but even raw material supply equipment is automatically controlled.

Raw materials are fed into the receiving hoppers from trucks and a 400 ft. belt conveyor carries these materials at a rate of 720 tons per hour to the head house of the batching plant and storage bins.

The batcher has a 6½ cu. yd. capacity and is fed by overhead bins through gates individually operated by air cylinders.

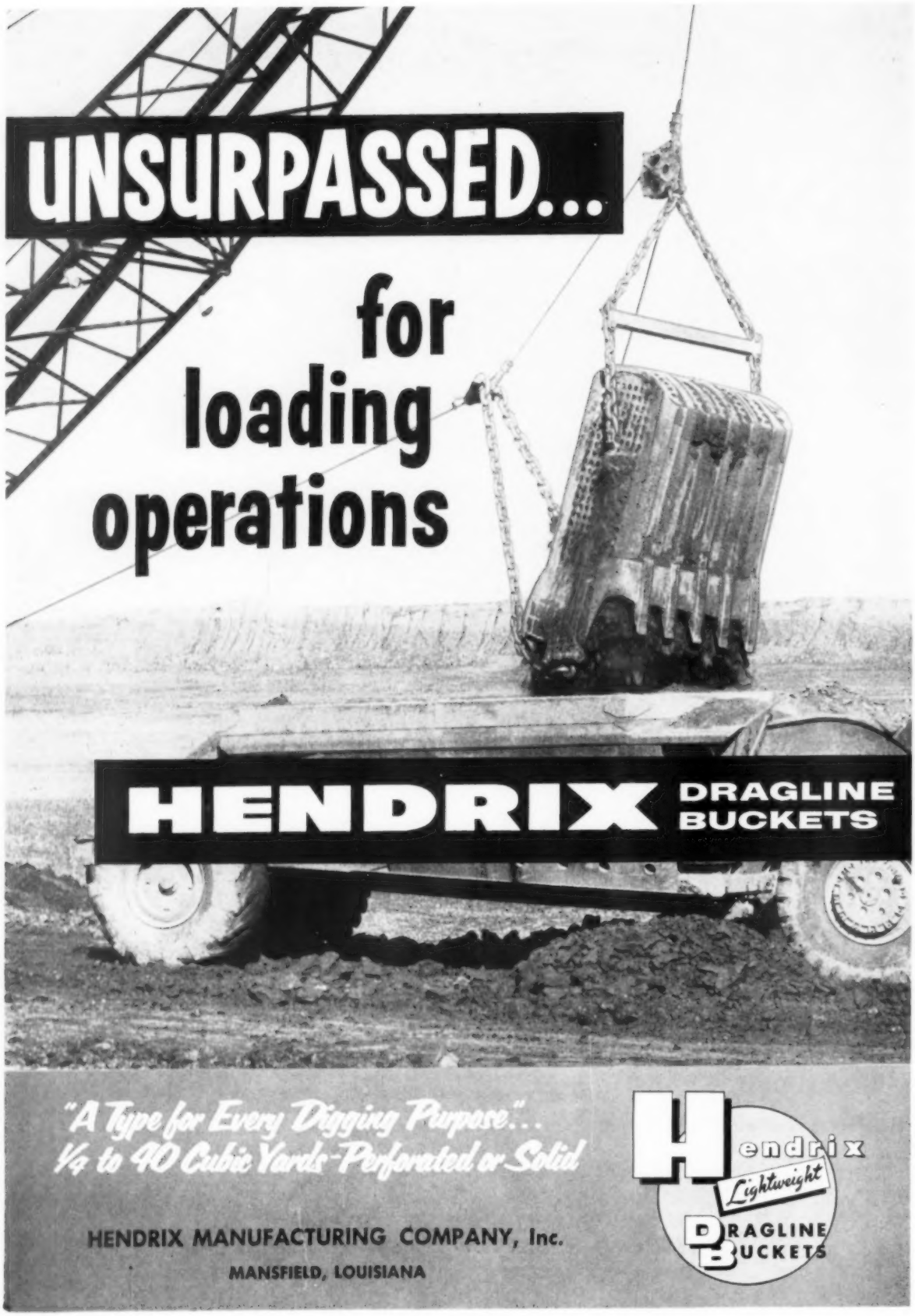
An ingenious push-button control system operates practically every piece of equipment in the plant.

This complete new plant, a model of automatically controlled precision, was designed and built by Fanning-Schuett Engineering Company.

AUTOMATIC CONTROL

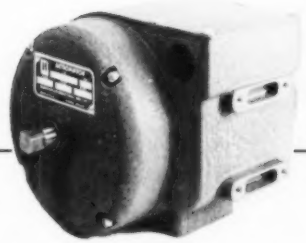
Although the plant shown above is completely automatic, Fanning-Schuett can offer varying degrees of automation as required. Starting with a minimum of automatic control for the small operation and progressing to the completely automatic plant, there is a degree of automation to fill your needs. Let us help you find it.

FANNING-SCHUETT ENGINEERING COMPANY
4325-39 NORTH THIRD STREET PHILADELPHIA-PENNSYLVANIA


UNSURPASSED...
for loading operations
HENDRIX DRAGLINE BUCKETS
"A Type for Every Digging Purpose"...
¼ to 40 Cubic Yards-Perforated or Solid
HENDRIX MANUFACTURING COMPANY, Inc.
MANSFIELD, LOUISIANA
Hendrix Lightweight DRAGLINE BUCKETS

has the power you need for high accuracy in many electric control applications

New INDUSTRIAL VALVE MOTOR SERIES 831E



The **ACTIONATOR*** gives dependable, low-cost service where the application calls for medium power.

Operate valves, dampers, louvers and other final control elements with this rugged, lightweight industrial motor. It's available with on-off, two-position, floating or proportional control. Its features include:

- **High torque ratings**—to 200 inch-pounds.
- **Fast speeds** available to meet application requirements.
- **Internal brake** to hold load in any position without coasting or hunting.
- **Easy adjustments**—readily accessible, field adjustable, cam-operated travel and auxiliary switches.

For details, write for Specification S-804-3, or call your nearby Honeywell field engineer.

**Tradename Minneapolis-Honeywell Regulator Co.*

Designed primarily for valve or damper applications, Honeywell's powerful new Industrial Valve Motor is suitable for many other control applications where high accuracy and reproducibility are required. It rounds out the complete line of Honeywell pneumatic and electric industrial motors.

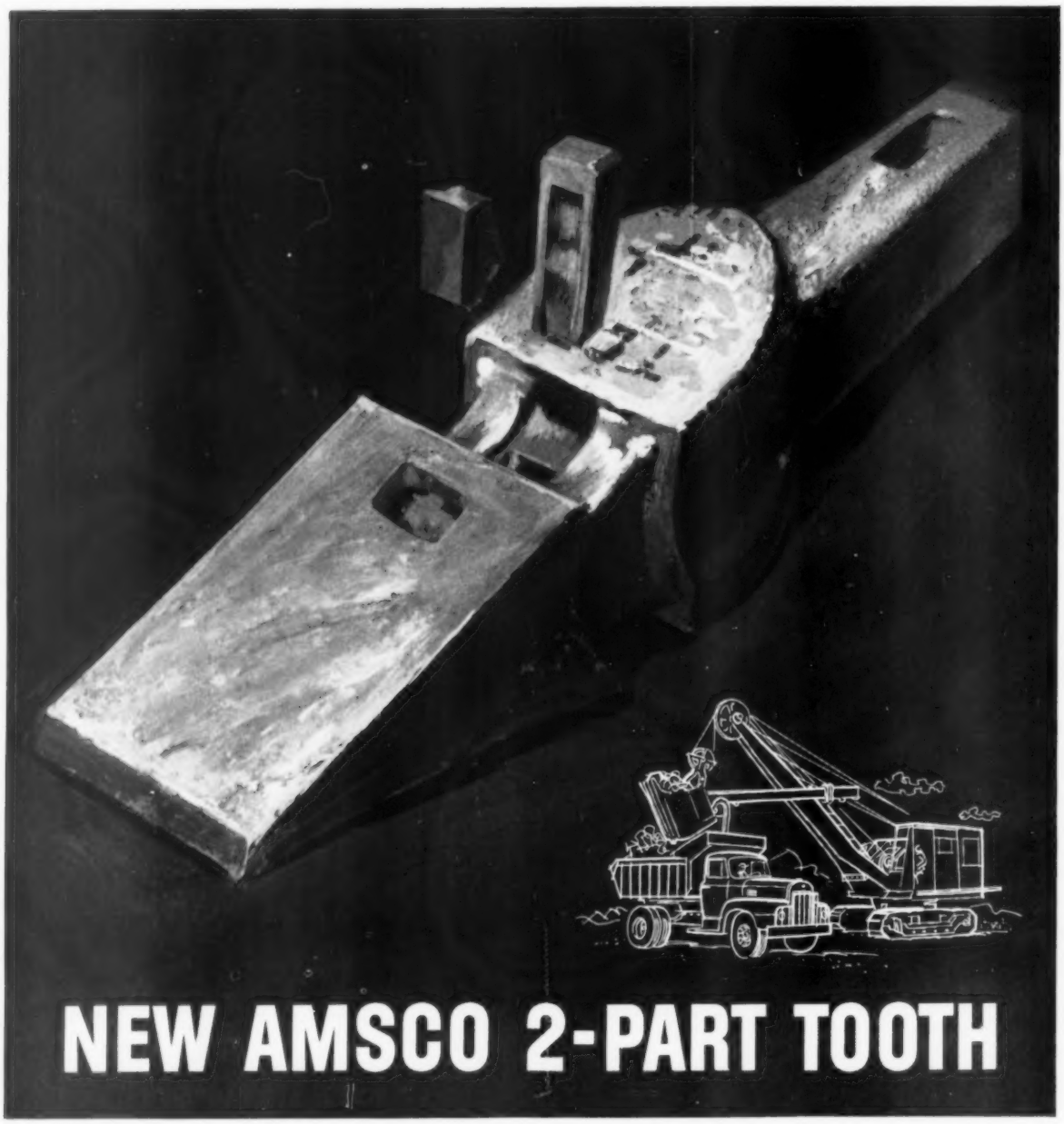
Some of its outstanding features:

- Positive control action without coasting.
- Accurate positioning of final control elements over full drive shaft rotation.
- Over-travel protection for the slidewire.
- Arc-suppression circuit to protect auxiliary relays.
- Readily accessible internal components.
- Variety of speeds (3 to 120 seconds) and modes of control available.
- Rated output torque—up to 62.5 ft. lbs.

For complete details on the new Series 831E Industrial Motor, write for Specification S-804-2, or call your nearby Honeywell field engineer. MINNEAPOLIS-HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pa.

Honeywell

H HONEYWELL *First in Controls*



NEW AMSCO 2-PART TOOTH

Special-alloy reversible tips *(easy to reverse)* nearly double tooth digging life...

In quarry work, in cold and hot slag pits . . . in the roughest of digging tests, these new Amsco® 2-part Simplex teeth have outlasted competitive 2-part teeth more than 2 to 1 . . . at a big saving in tip and adapter replacement time.

You get this longer wearing quality because of the special, rugged alloy used for both tip and adapter. Reversing tips extends digging life even more, yet takes only a few minutes.

Adapters outlast several sets of tips, are equally easy to replace. Pin lock between tip and adapter seats and locks so securely, metal-to-metal, that even side blows can't jar it loose.

We'll be glad to send you a booklet containing reports by Simplex users and describing this new Amsco tooth completely. Write for it today.

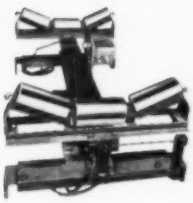
AMERICAN Brake Shoe COMPANY

AMSCO

American Manganese Steel Division · Chicago Heights, Illinois

WEIGHING... **BATCHING...**

Fairbanks-Morse Scales Offer New Economy, Accuracy, Speed...Electronically!

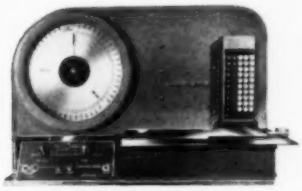


Belt conveyor scale and instrument

Read-out to auto-typewriter or tape

Punch card operated sequence batcher

Desk instrument for weighing



Desk instrument for weighing and printing

Sequence batcher for manual programming

Even Adapts to Present Mechanical Systems

Fairbanks-Morse electronic control and instrumentation permits remote location of weight recording instruments...assures automatic balance detection...automatic ranging without drop-weights...automatic zeroing...pushbutton recording and much more.

This same electronic control of weight measurement can be employed to streamline your batching operation. You can select precise quantities of all materials...in proper sequence...at the push of a button. Or you can put the batching formula on a punch card and do the whole job automatically.

Weight readings can be fed to automatic typewriters, adding machines, tape punchers, etc. Chances are your present lever system can be converted to electronic operation.

For more information write today for new literature. Fairbanks, Morse & Co., 600 S. Michigan Avenue, Chicago 5, Illinois.

FAIRBANKS-MORSE

a name worth remembering when you want the BEST

SCALES • PUMPS • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MAGNETOS

when the stone comes tumbling down...

HENDRICK PERFORATED PLATE STANDS UP!

Hendrick H Quality Steel Plate stands up under the toughest, heavy-duty screening of crushed stone. It's made from high carbon or stainless steels. High carbon can be heat-treated after perforation for longer life. It screens faster and easier, while full openings eliminate blinding. Product uniformity is assured throughout the life of the screen. Deck changes are quick, for lowered labor costs.

Hendrick H. Quality Steel Perforated Plate is available either flat, corrugated or stepped, in any desired shape, and with perforations of any size.

HENDRICK MANUFACTURING COMPANY
39 Dundaff Street Carbondale, Pa.

Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Hendrick Wedge Wire Screens • Architectural Grilles • Mitco Pen Steel Flooring
Shur-Site Treads • Armorgrids • Hydro Dehazers • Distillation Column Internals

Enter 260-A on card, page 211

LOW COST POWER
For Fast "Secondary Breakage"

FREDERICK *CAST SEMI-STEEL* DROP BALLS

Tough, rugged Frederick Drop Balls give you crushing power where you want it, when you want it . . . cut down expensive drilling or blasting . . . give long, economical service with little or no maintenance. Exclusive "Pear shaped" design withstands greater impact—drops straighter. "E-Z Swing" recessed steel eye gives cable protection plus free swinging action. Use Frederick Cable Weights (135 & 250 lbs.) and Frederick Swivels on all size balls for true, safe cable performance. Nickel alloy standard on all 4000 lbs. or over—or special alloys furnished on request. Balls can be furnished with replaceable pins. Special release hooks for free dropping also available.

Write us today for prices and illustrated literature. Order Balls direct or see your nearest Equipment Dealer.

Wide range of sizes and weights:

Pear shape (lbs.)	1500	2000	3300	4000	5200	6500	8000	10,000
Ball shape (lbs.)	500	1000	2000	5200				
Spherical shape (lbs.) (for magnet use)	470	950	1650	2400	3000	3700	5400	6900

FREDERICK IRON & STEEL, INC.
FREDERICK *Established 1890* MARYLAND
Phone: MOnument 3-5111

CENTRIFUGAL PUMPS • MUNICIPAL AND GRAY IRON CASTINGS

Enter 260-B on card, page 211

get uniform, accurate analysis of bulk materials with

SYNTRON TEST SIEVE SHAKERS

The new, improved SYNTRON Test Sieve Shakers provide a more positive control of components and more uniform sieve analysis of bulk materials.

SYNTRON Test Sieve Shakers feature a larger, more powerful electromagnetic drive for rapid, positive gradation plus lower maintenance, with a rheostat and voltmeter for comparable tests under identical conditions and a reset timer for accurately timed test periods.

SYNTRON Test Sieve Shakers use 6 standard 8" test sieves and bottom pan in a coarse and fine series.

Operation is from 115 volt, 60 cycle a-c.

TS 0358

Write for complete information on SYNTRON Test Sieve Shakers — FREE

SYNTRON COMPANY
385 Carson Avenue Homer City, Penna.

Enter 260-C on card, page 211

Enter 261 on card, page 211 →

"EXTREMELY WELL CONSTRUCTED" says operator Herschel Buck (left) about this American Shovel. "... Its air controls are grouped for very easy operation." In addition to loading limestone, this versatile shovel is used to strip 18 to 22 feet of overburden and handle a drop ball to break up rocks too large for the crusher.

AMERICAN 1½ YARD SHOVEL DIGS 1000 TONS OF LIMESTONE DAILY

Limestone for roads, asphalt mix and agricultural use are produced in quantities up to 1000 tons per day at the Rockford Stone Company. After each shot, Rockford's big American 700 Series Shovel moves in quickly and loads trucks feeding the primary crusher. Even at such high production rates, the American Shovel has enough free time to perform other important jobs.

Manager of the Rockford, Ohio firm, William E. Beerbower says "The American is a well built machine—it has easy access to operating parts for maintenance or repair. These are two of the main reasons why we decided on American." He reports both operating and maintenance costs "at a minimum"!

Only tough rock work can prove shovel durability! Hundreds of hours of trouble-free, low cost operation on jobs like this positively prove that the rugged 700 Series Excavators and Cranes stand up longer—take the abuse and do more work too! Americans are engineered and manufactured to produce more at lower cost and keep your profits up. Call your American Distributor for all the facts on the complete line of American Cranes and Excavators—there's a size, a front, exactly right for your job!

EXCAVATORS-CRANES
to 2 yds.-50 tons
LOCOMOTIVE CRANES
to 130 tons
DERRICKS-HOISTS
to 800 tons
REVOLVER CRANES
to 400 tons

AMERICAN HOIST
and Derrick Company
St. Paul 7, Minnesota

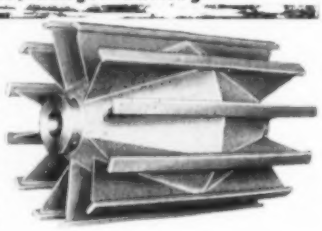
AMERICAN HOIST PACIFIC COMPANY
Special materials handling equipment

CROSBY-LAUGHLIN DIVISION
Drop forged fittings for wire rope-chain

REDUCE Material Handling Costs WITH ELEVATING and CONVEYING EQUIPMENT by STANDARD METAL

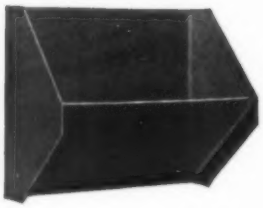
WING-TYPE SELF-CLEANING PULLEY
Lower Cost, Stronger, Longer Lasting

Reinforced all-steel welded construction of this pulley provides longer service, lower operating costs, greater efficiency. Built to deliver maximum service under severe operating conditions, Standard Metal's Self-Cleaning Pulley combines greater strength with less weight.



CONTINUOUS ELEVATOR BUCKET—STYLE #2
Exceptional Resistance to Wear

This style of bucket is just one of several types of rugged, longer lasting, low-cost steel elevator buckets manufactured by Standard Metal. Available in Salem, Style "A," Shelf Type and other continuous style buckets for all types of operations.



GEAR-OPERATED BIN GATE
Easy-to-Operate for Greater Output

This Standard Metal Bin Gate has all-steel welded construction for longer life. It is fast and efficient, helps reduce handling costs. Other styles of bin gates by Standard Metal also are available.

Write today for details and quotations on your needs in elevating and conveying equipment for new installations or replacements. Request our complete catalog, too.

SM7

The Standard Metal Mfg. Co. SINCE 1921

STANDARD METAL MFG. CO.
110 CENTER ST. MALINTA, OHIO

Enter 262-A on card, page 211

CUT COSTS!

Blast Metal Away with ARCAIR!

Here's metal removal to beat anything you've ever seen before! Arcair Torch cuts, gouges, grooves, bevels or flushes off *any* metal . . . does it faster, cheaper, through a revolutionary combination of the electric arc and ordinary compressed air.

Inexpensive to install, economical to operate, easy to use—works with any standard arc welding unit.

WRITE TODAY FOR COMPLETE INFORMATION!

Arcair Metal Removal Torches
467 S. Mt. Pleasant St., Lancaster, Ohio

Enter 262-B on card, page 211

CONTRACT CORE DRILLING

EXPLORATION FOR MINERAL DEPOSITS
INCLUDING URANIUM & LIMESTONE — ANYWHERE

FOUNDATION TEST BORING

GROUT HOLE DRILLING

Skilled crews and complete stock of core drills and accessory equipment maintained at all times

Core Drill Contractors for more than 60 years

JOY MANUFACTURING CO.
Contract Core Drill Division
MICHIGAN CITY, INDIANA

Enter 262-C on card, page 211

DEPENDABLE FOR 60 YEARS

Woven Wire

ALLOY SCREENS

TWIN CITY IRON & WIRE CO.
St. Paul, Minnesota

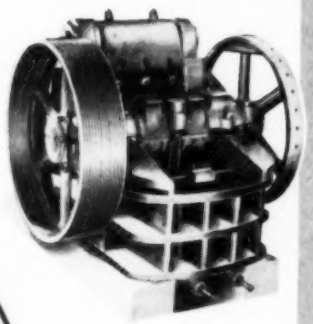
Enter 262-D on card, page 211

Traylor-MADE
for the CEMENT INDUSTRY

Suppliers of machinery for the cement industry for over fifty years.

Traylor TC Gyratory Crusher

Traylor Type HB Jaw Crusher



Traylor Rotary Kiln

GYRATORY CRUSHERS

Traylor — the outstanding name in cement machinery. Traylor features a line of Gyratory Crushers, primary and secondary, that incorporate many advance design advantages. For complete information on Traylor Gyratory Crushing Machinery, state your needs and a bulletin will be speeded to you.

JAW CRUSHERS

Traylor Jaw Crushers have proven their dependability and productivity in years of operations in the field. Featuring curved jaw plates, a Traylor first, these jaw crushers are made in sizes to suit the needs of the cement operator. Write to Traylor stating your crushing problem and a bulletin will be forwarded to you.

ROTARY KILNS

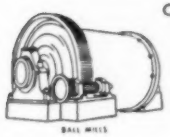
Hundreds of Traylor Rotary Kilns are in daily use by many industries reflecting the soundness of design and high standards of Traylor craftmanship. These Kilns incorporate many advance design features that will help increase your production efficiency. Write today for bulletins describing Traylor Rotary Kilns, Coolers, Slakers and Dryers.

TRAYLOR ENGINEERING & MFG. CO., 1065 MILL ST., ALLENTOWN, PA.

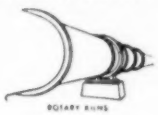
Sales Offices: New York — Chicago — San Francisco

Canadian Mfr.: Canadian Vickers, Ltd., Montreal, P.Q.

Traylor



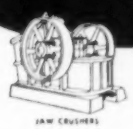
BALL MILLS



ROTARY KILNS

APRON FEEDERS

PRIMARY GYRATORY CRUSHERS



JAW CRUSHERS

SECONDARY GYRATORY CRUSHERS

"Screen changing is faster and easier with SUPER-TEMPERED SCREENS"

—so says Mr. Curtis S. Harper, Superintendent of Operations at the 5000-ton-per-day plant of the Flint Sand and Gravel Company, Bluff Creek, La.

Flint is a division of Jahncke Service Incorporated, New Orleans, one of the South's leading producers of ready-mix concrete, concrete pipe and aggregate. Flint is called upon to produce many sizes of sand and gravel for Jahncke's operations. "This means that we have to change our screens as often as three times a day," Mr. Harper says. "It's here that Super-Tempered Screens really pay off.

"Because Super-Tempered Screens are so tough, we can employ a screen with a smaller diameter wire than we formerly used. This results in a lighter-weight, more flexible screen, which allows easier changing. Before switching to Super-Tempered Screens, it took approximately 65% longer to change a set of three screens. In addition, the lighter screen weight enabled us to cut our six-man crew down to five.

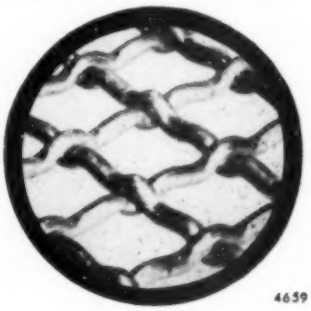
"Super-Tempered Screens helped us lick another problem," says Mr. Harper. "With our old screens, the ends bent down when a wire broke. This left holes in the screen, throwing our tolerances off by allowing larger stones to pass through. But the wires of Super-Tempered Screens are so hard that they don't fold under when broken. In fact, when the cross-over section of these screens gets thin, we can safely reverse the screen. This gives us, in effect, double life from each screen.

"Furthermore, the smaller wire diameter of the Super-Tempered Screen gives us a greater percentage of open area per square foot. This not only increases screen efficiency by allowing more "thru-put" per hour, but also results in less choking from the clay overburden that passes through the plant," Mr. Harper concludes.

If yours is a normal plant operation . . . or one that requires unusually frequent screen switching . . . it'll pay you to get complete details on how Super-Tempered Screens can help you. Why not contact our nearest sales office today?

CF&I **SPACE SCREENS**
THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION—Albuquerque · Amarillo · Billings · Boise · Butte Casper · Denver · El Paso · Ft. Worth · Houston · Lincoln (Neb.) · Los Angeles · Oakland · Oklahoma City Phoenix · Portland · Pueblo · Salt Lake City · San Antonio · San Francisco · Seattle · Spokane · Wichita
WICKWIRE SPENCER STEEL DIVISION—Atlanta · Boston · Buffalo · Chicago · Detroit · New Orleans New York · Philadelphia
CF&I OFFICES IN CANADA: Montreal · Toronto · **CANADIAN REPRESENTATIVES AT:** Calgary · Edmonton Vancouver · Winnipeg



4659

Advertising rate per issue:

$10.50 per column inch. Lower rates for larger space used and/or on a contract basis.

Write for rate card.

Closing date:

20th of month preceding date of publication.

PIT & QUARRY
431 S. Dearborn St. Chicago 5, Ill.

BROADCAST

Section

SALES ENGINEER

Position with large manufacturer of basic chemicals. Knowledge of mining methods and open pit blasting procedures essential. Unusual opportunity to assist in the direction of an established field sales force currently engaged in penetrating the national rock breaking market. This individual should be capable of providing needed technical guidance. Considerable travel for first several years required. Liberal employee benefits with salary commensurate with experience plus Incentive Bonus. Please reply to

Box No. PQ-104-G, c/o Pit & Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

Cement Company in Great Lakes Area requires:

GENERAL MANAGER

responsible for operation, sales and administration of the Company. Position is offered to a high-class Executive who is interested to work independently and to take responsibilities. Experience in the cement or in a related industry is necessary.

Age between 35 and 55 years.

Salary range between $20,000 and $40,000, according to experience.

SALES MANAGER

Position is offered to an Executive having experience in the cement sales or in a related industry.

Age between 35 and 50 years.

Salary range between $15,000 and $25,000, according to experience.

Please send application in your own handwriting with complete details as to education, experience, references and photo. Applications will be treated in strict confidence.

Box No. PQ-103-G, c/o Pit & Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

WANTED MANAGEMENT TRAINEE

Large Southwest aggregates producer has opening for production management trainee to 35 years of age with engineering degree and experience in this industry. Reply to:

Box No. PQ-101-G, c/o Pit & Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

SUPERINTENDENT OF PLANT MAINTENANCE

An opportunity with a future is open to the properly qualified man. Must be thoroughly familiar with crushing, screening, belt conveying, and magnetic separation equipment, and all electric power and control details connected thereto. Responsibility will be for all maintenance in a five plant operation. Give age, experience, job references, and salaries earned.

Box No. PQ-102-B, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Ill.

FOR SALE

Package dry mix concrete plant includes bins, elevator, mixer, sewing machine, dryer and automatic scale.

Box No. PQ-106-G, c/o Pit & Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

FOR SALE

Going Concrete Block business in Pennsylvania town of 140,000 market conditions very good, good season for selling. Besser equipment.

Box No. PQ-105-G, c/o Pit & Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

QUARRY PIT FOREMAN

Crushed Stone Quarry in Chicago Area. Write, Giving Complete Details of Experience and Salary Desired.

Box No. PQ-109-E
c/o Pit & Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

MASTER MECHANIC

Crushed Stone Quarry in Chicago Area. Write, Giving Complete Details of Experience, Education and Salary Earned.

Box No. PQ-110-E
c/o Pit & Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

SALES POSITION WANTED

With manufacturer of machinery for cement plants, multiwall bags, block machines or concrete equipment. Age 31. Top Notch Qualifications. Willing to relocate. If you have an opening, I would sincerely appreciate contact.

Reply to
Box No. PQ-107-F, c/o Pit & Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

FOR SALE

Used Barber-Greene 4000 lb. automatic batch type asphalt plant priced to sell.

Contact

Farley Equipment Company
2136 River Road
River Grove, Illinois
Phone Chicago Eastgate 7-1820

MANAGER WANTED

Wanted for Cuba. Man capable of managing washed sand operation. Speaking knowledge of Spanish necessary. State experience.

Box No. PQ-102-G, c/o Pit & Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

GENERAL MANAGER WANTED

Concrete block plant in northwest Indiana needs general all-around manager to handle all phases of the business, including sales. Write, giving details of education, experience and salary desired. All replies strictly confidential.

Box No. PQ-107-G, c/o PIT & QUARRY PUBLICATIONS
431 S. Dearborn St. Chicago 5, Illinois

SHOVELS — DRAGS
CRANES
DRILLS — EUCLIDS

631 Page Elec. Drag, 200', 8 yd.
9-W Bucyrus Erie Elec. Drag, 200', 8 yd.
9-W Bucyrus Erie Diesel Drag, 175', 13 yd.
625 Page Diesel Drag, 150', 10 yd.
723 Page Diesel Drag, 130', 10 yd.
621-S Page Diesel Drag, 125', 7 yd.
200-W Bucyrus Erie Diesel Drag, 125', 6 yd.
7-W Bucyrus Erie Diesel Drag, 180', 5 yd.
5-W Bucyrus Erie Diesel Drag, 120', 6 yd.
2400 Lima Draghne, 130', 5 yd.
4500 Manitowoc Dragline, 120', 5 yd.
111-M Marion Dragline, 100', 4 yd.
3500 Manitowoc Dragline, 80', 2½ yd.
170-B Bucyrus Erie 6½ yd. Elec. Shovel
150-B Bucyrus Erie 6 yd. Elec. Shovel
4500 Manitowoc 5 yd. H. L. Shovel
120-B Bucyrus Erie 4 yd. Elec. Shovel
1400 P&H 4 yd. Elec. Shovel
Smaller Shovels & Draglines available
Model T-750 Reich Heavy Truck Mounted Rotary & Down-the-Hole Drill
McCarthy & Compton Coal Auger Drills
Euclid Trucks — Models 86FD, 27FD, 5FD, 2FD, 63TD, 36TD, 31TD, 25FDT, 38FDT, 67FDT

FRANK SWABB EQUIPMENT CO., INC.
313 Hazleton National Bank Bldg.
Hazleton, Pa. GLadstone 5-3658

TRANSFORMERS

3—1000 KVA Mol. 13200-2400/4160Y
3— 500 KVA W-H 33000-2400/4160Y
3— 500 KVA G-E 22000-2300/4000Y
3—500 KVA W-H 7200-2400/4160Y
3—333 KVA W-H 13800-240/480
3—333 KVA Mol. 2300-230x460

Send For Complete Information TODAY!

Transformers Bought, Sold, Repaired and Rented
45 Years of Dependable Service

The Electric Service Co.
5319 Hetzel Street • Cincinnati 27, Ohio

PERFECT QUARRY SITE

FOR SALE for crushed stone plant. Site is accessible. Practical for barge, rail and local shipment. No zoning problems. Located in Hudson River Valley on East side, near Route 9-D. About 600 acres. 55 miles from New York City.

Price: $250,000

GILBERT FORMAN
P. O. Box 315
Cold Spring, Putnam County, New York
Tel.: Cold Spring 5-3318

FOR SALE

Complete Ready-Mix Concrete Plant, 300 Ton Aggregate Bin, Two 600 Barrel Cement Bins. Model 56S Koehring Mixer, Conveyors, Elevators, Batcher and other necessary equipment. Located Nashville, Tenn. This Plant now ready for operation or can be moved to another location.

WEST TENNESSEE LIMESTONE COMPANY
3813 Hillsboro Road
Room 230
Nashville, Tennessee

Assayers
Consultants
Designers

Professional Services

Engineers
Geologists
Technicians

Quarries
Crushing Plants
Cement Plants
Storage Methods
Operating Costs

E. Lee Heidenreich, Jr.
Consulting Engineer
75 Second St.
Newburgh, N. Y.
Phone: 1828
9 South Clinton St.
Chicago 6, Ill.
Ph. FR. 2-4186

Construction
Design
Operation
Plant Layout
Appraisals

FOUNDATION TESTING, CHEMICAL ANALYSIS
CORE DRILLING
Thomasville Drilling & Testing Co.
THOMASVILLE, PENNA.

CONTRACT DRILLING
Specializing in Quarry Blast Holes using
Ingersoll-Rand Drillmasters
NEW JERSEY DRILLING CO., INC.
Box 431, Madison, N. J. FRontier 7-5996

JOHN F. MEISSNER ENGINEERS INC.
CONSULTING & DESIGNING ENGINEERS
BULK MATERIALS HANDLING
SPECIALISTS IN DESIGN OF CRUSHED STONE, SAND, GRAVEL AND READY-MIX PLANTS
308 W. WASHINGTON • CHICAGO 6, ILL.

LIGHT WEIGHT AGGREGATE PLANTS
RESEARCH — PLANNING — DESIGN
ROCK CRUSHING — SAND AND GRAVEL PLANTS
WM. HANSON SR.
1019 No. Wooster Ave. Dover, Ohio

ATTENTION
CONTRACTORS & QUARRIES

"Don't throw away your 1¼" Hex Carburized Drill Steels."
We have the facilities for Re-threading and *RE-CARBURIZING* the broken ends as good as new—
Our Methods are Field Tested and approved by many CONTRACTORS and QUARRIES—
$8.00 each end for Timken 06 Series, Gardner Denver Series 600 and I.R. Type 60 Threads—
Send us your broken steels freight prepaid. We will ship freight prepaid on shipments over 300 pounds.

MALDEN EQUIPMENT CORPORATION
12B Newland Street
Malden 48, Mass. **Tel: DAvenport 2-5540**

CORE DRILLING ANYWHERE
We look into the earth
PENNSYLVANIA DRILLING COMPANY
PITTSBURGH 20, PA.

Write for our attractive Professional Advertising Rates

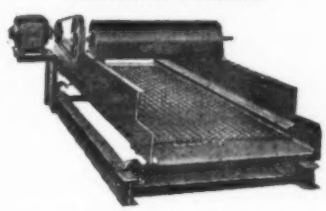
R. L. LOOFBOUROW, Min. Engr.
Site Appraisals — Plans — Estimates
and Supervision of
Underground Construction — Mining
4032 Queen Ave. So. Minneapolis 10, Minn.

CARL J. LOFSTEDT
Consulting Engineer
Cement, Rock Crushing and Rock Processing Industries.
505 Longview Road
Knoxville 19, Tenn.
1103 First National Bank
Yonkers, N. Y.

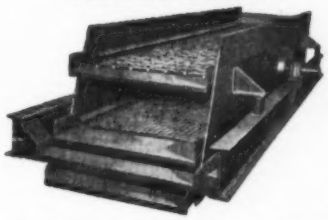
BONDED EQUIPMENT BARGAINS

NEW CURRENT MODELS IMMEDIATE SHIPMENT FROM OUR FACTORY - WRITE, WIRE OR PHONE FOR FREE CATALOG AND PRICES

NEW BONDED® GENERAL DUTY VIBRATING SCREENS



NEW BONDED® HEAVY DUTY VIBRATING SCREENS



For mineral, chemical and other industrial products. Fast, efficient and economical for cleaning, sizing, grading, dewatering. Made in all metals, including stainless steel. Enclosed models for hot materials or dust control. Bonded screens are built for any screening operation, wet or dry.

GENERAL DUTY SCREENS, TYPE A: Eccentric weight mechanism, spring mounted, 1 to 3 decks, 2' x 4' to 3' x 8'. **WRITE FOR BULL. #1086.**

Model Number	Screening Price	No. of Decks	Sale Price
124A	2'x4'	1	$ 443
224A	2'x4'	2	472
126A	2'x6'	1	472
226A	2'x6'	2	501
134A	3'x4'	1	504
234A	3'x4'	2	570
136A	3'x6'	1	581
236A	3'x6'	2	688
336A	3'x6'	3	956
138A	3'x8'	1	675
238A	3'x8'	2	815
338A	3'x8'	3	996

HEAVY DUTY MODELS, TYPE B: Four bearing positive throw eccentric shaft: 3' x 6' to 5' x 14', 1 to 5 decks. **WRITE FOR BULL. #1087.**

Model Number	Screening Area	No. of Decks	Sale Price
336B	3'x6'	3	$1620
436B	3'x6'	4	1685
138B	3'x8'	1	1510
238B	3'x8'	2	1620
338B	3'x8'	3	1735
248B	4'x8'	2	2310
348B	4'x8'	3	2440
2410B	4'x10'	2	2400
3410B	4'x10'	3	2550
2412B	4'x12'	2	2590
3412B	4'x12'	3	2970
4412B	4'x12'	4	3165

NEW BONDED® TROUGHING IDLER CONVEYOR BARGAINS

CONVEYOR PRICES INCLUDE BELTING

Complete Pre-Fab sections of 8" Jones & Laughlin Jr. I Beam Frame Conveyors quickly and easily joined together on the job. These beams are rolled with .20% Copper Content. Atmospheric exposure tests disclose that Junior Beams with .20% Copper have as much as four times the resistance to corrosion as non-copper steels. Braced with structural angle, welded to frame for maximum rigidity. Equipped with 5" roll diameter idlers and return rolls, 20" diameter head pulley and 16" diameter tail pulley, mounted on 2¼" or 2 7/16" diameter shaft. We take our loss on our stock of short length belting. You can save as much as 50% on BONDED CONVEYOR SPECIALS, with conveyor belting in two pieces. Belt is new 4-ply, 28 oz. duck, ⅛" top rubber cover x 1/32" bottom cover Major grade belt and is Fresh Stock made by leading manufacturers. **WRITE FOR BULLETIN #1138.**

Bonded troughing idler conveyors also available in Truss Frame Construction. **WRITE FOR BULLETIN #1189 AND PRICES.**

A full line of accessories available, including carrying and return belt covers.

Belt Width	Length of Conveyor	List Price	Sale Price	Add or Deduct Per Foot
14"	25'	$1397	$ 722	
14"	50'	2222	1144	$16.84
14"	85'	3377	1733	
16"	20'	1262	636	
16"	45'	2137	1088	18.04
16"	60'	2662	1359	
16"	90'	3712	1900	
18"	25'	1477	794	
18"	45'	2217	1166	
18"	70'	3142	1648	19.24
18"	85'	3697	1933	
18"	100'	4252	2220	
18"	130'	5362	2797	
20"	25'	1517	828	
20"	60'	2882	1533	20.37
20"	75'	3467	1838	
20"	90'	4052	2145	
24"	25'	1590	898	
24"	45'	2430	1330	
24"	70'	3480	1875	21.78
24"	100'	4740	2514	
24"	120'	5580	2950	
24"	150'	6840	3603	
30"	50'	2911	1617	24.75
30"	70'	3871	2119	
30"	90'	4831	2614	
36"	25'	1818	1118	
36"	45'	2858	1678	27.95
36"	60'	3638	2096	
36"	100'	5718	3214	

BUILD YOUR OWN CONVEYOR WITH NEW PARTS

Ready-Made Head, Tail and Intermediate Conveyor Sections
All Types Idlers, Return Rolls, Belting, Reducers and Motors in Stock

Head & Tail $149.00

Carry Belt Guide Idler $14.50

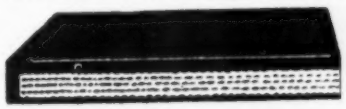
Return Belt Guide Idler $11.75

Holdback $99.00

Wing Pulley $71.00

NEW CONVEYOR BELTING AT NEW LOW PRICES SAVE UP TO 44%

WE PAY FREIGHT ON 200 POUNDS OR OVER



Quality Tested Conveyor Belting*

Major Brand: 12# to 15# Average Friction Pull. 800# to 1000# Average Cover Tensile. Heavy Duty 4-ply, 28-oz. duck, ⅛" top rubber cover x 1/32" bottom rubber cover belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stocks.

Width	Ply	List Price Per Ft.	Sale Price Per Ft.
14"	4	$3.63	$2.29
16"	4	4.08	2.41
18"	4	4.51	2.66
20"	4	4.97	3.08
24"	4	5.85	3.45
30"	4	7.18	4.22
36"	4	8.51	5.01

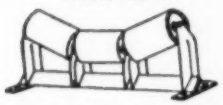
Major Bee Brand: 16# to 19# Average Friction Pull, 2500# to 3000# Average Cover Tensile. Skim coat between plies.
A high grade of heavy duty 4 and 5-ply, 28 oz. duck, ⅛" top rubber cover x 1/32" bottom rubber cover. These belts are for more severe service, high tonnages and abrasion resistance. For handling stone, mineral ores, concrete, cement, coal, and other similar materials, both wet and dry. Belts have molded rubber edges.

Width	Ply	List Price Per Ft.	Sale Price Per Ft.
14"	4	$4.31	$2.48
16"	4	4.85	2.80
18"	4	5.39	3.10
20"	4	5.90	3.54
24"	4	6.94	4.00
30"	4	8.53	4.92
36"	4	10.09	5.95
24"	5	8.14	4.68

***All belting is tested by the Engineering laboratory of one of the largest universities in the United States. It is guaranteed to meet or exceed listed specifications.**

Other widths, plies, duck weights and cover thickness available at low prices. **WRITE FOR FREE SAMPLE AND BULLETIN #1209.**

NEW IDLERS AND RETURN ROLLS SAVE 25%



3-roll, 5" diameter Troughing Idlers for:

14" belt	$18.50	24" belt	$21.25
16" belt	19.25	30" belt	22.00
18" belt	20.50	36" belt	22.75
20" belt	20.75	48" belt	25.50

1-roll, 5" diameter Return Idlers for:

14" belt	$7.25	24" belt	$ 8.50
16" belt	7.50	30" belt	9.50
18" belt	8.00	36" belt	10.00
20" belt	8.25	48" belt	11.50

All steel. Interchangeable with other well-known makes. Furnished with replaceable pre-lubricated sealed ball bearings. Maintenance is negligible. **WRITE FOR BULLETIN #1138.**

BONDED SCALE AND MACHINE COMPANY

PHONE Days: Hickory 4-2186 — **WRITE FOR FREE CATALOG AND PRICES** — **PHONE Evenings: A.T. 1-2213, HU. 6-3156**

110 Bellevue — **Mfrs. of Scales, Conveyors, Conveyor Parts, Idlers, Vibrating Screens, Crushers and Feeders** — **COLUMBUS 7, OHIO**

FOR SALE

25½ Kennedy Van Saun Gyratory Crusher
V Belt Drive—Used 1 year

T. LANDI & SONS INC.

RIDGEDALE AVE. — **BOX 609**
TEL. JE. 8-3036 — **MORRISTOWN, N. J.**

DEPENDABLE USED MACHINES

SPECIAL: Marion 33M ⅝ yd. Dragline powered by GMC 3630C Diesel Engine

Jeep CJ w/Jeep-a-Trench & dozer blade	P&H 255A ¾ yd. backhoe	Telsmith dd screens
Ray City 12½ ton Skeleton trailer	Unit 514 ½ yd. backhoe	Amer. rar pullers
Amer. 50B 3-drum hoist w/slewer	30x73 B-G conveyor	18x25 conveyor
Fordson backhoe & loader 850	Pioneer 30"x15' conveyor	Universal 8x8 Feeder
Insley K-12, ½ yd. dragline	Ray City 25 crawler	Tandem trailer

This equipment rebuilt in our modern plant by expert mechanics. Come see it!

10004 Southwest Highway — **TRACTOR & EQUIPMENT CO.** — **Oak Lawn, Ill.**

FOR SALE

EUCLID TRUCKS

Rear and Bottom Dumps

Bucyrus-Erie Draglines, 2½ yd. to 8 yd.
Bucyrus-Erie Shovels, ¾ yd. to 8 yd.
Northwest Draglines, ¾ yd. to 2½ yd.
Northwest Shovels, ¾ yd. to 2½ yd.
Manitowoc Draglines, 2½ yd. to 5 yd.
Manitowoc Shovels, 2½ yd. to 5 yd.
Marion Shovels & Drags, 4 yd. to 9 yd.
Lima Shovels & Drags, 1½ yd. to 6 yd.
Osgood Shovels & Drags, 1½ yd. to 2½ yd.
P & H Shovels & Drags, all sizes.
Caterpillar Graders & Dozers.
Hi-Lift Shovels.
2½ yd. Crawler Crane.
TRUCK CRANES—P&H and Bay City.
51B Bucyrus-Erie Shovel Attachment.
2400 Lima Shovel front attachment.
4500 Manitowoc Shovel front attachment.
DRILLS—6" and 9", diesel and electric.
6 Northwest Shovel and Drag, 1½ yd.
80D Northwest Shovel, 2½ yd., Bargain.
95 Northwest Dragline, 2½ yd., Bargain.
38B Bucyrus-Erie Shovel, Backhoe & Drag.
54B Bucyrus-Erie Shovel, Drag. Bargain.
88B Bucyrus-Erie Shovel, 4 yd.
120B Bucyrus-Erie Electric Shovel, 6 yd.
170B Bucyrus-Erie Electric Shovel, 6½ yd.
9W Bucyrus-Erie Electric Walking Drag, 200' boom, 9 yd. bkt.
200W Bucyrus-Erie Dragline, 125' boom
631 Page Elec. Drag. 200' 8 Yd.
625 Page Diesel Drag. 150' 10 Yd.
955 P&H Shovel and Dragline.
1055 P&H Shovel and Dragline.
C. S. Johnson Automatic Batch Plant.
Used Lowbed Trailers.

Other equipment available not listed above.

WILLIAM LUBRECHT, III
Construction Equipment
311 W. Diamond Ave. • Hazleton, Pa.
Phone: Gladstone 5-4041 or 5-0253

SPECIALS

1—6½' x 120' & 8' x 125' kilns

DRYERS

6' x 60' & 7' x 80'

CRUSHERS

1—30" x 36", 18" x 36", 15" x 30", 12" x 24" Jaw Crushers.
2—42" x 16" Allis-Chalmers Crushing Rolls, rebuilt, 36" x 16 rebuilt Sturtevant rolls.
2—24" x 14" Rogers Iron Works Crushing Rolls, Rebuilt.
1—6", 10", 16", 20" McCully Superior Gyratory Crushers.
No. 3 up to No. 12 Gyratory Crushers.

BALL & TUBE MILLS

2—5½' x 20', 6' x 22', 7' x 24' Tube Mills.
1—8' x 10' Rotary Filter.

MISCELLANEOUS

We make new dryers and kilns.
1—#1 Raymond Mill.

Have you any machinery that you want to sell?

W. P. HEINEKEN, INC.
50 Broad St., N.Y. **Tel. Wh. 4-4236**

CABLEWAY 10 TON SAUERMAN

900 Ft. span, fixed steel head tower 125 Ft. high, movable tall tower 60 Ft. high Diesel Power, New 1952, discontinued 1954.

Brew-Woltman & Co., Inc.
50 Church St. **New York 7, N. Y.**

FOR SALE

65 ton diesel-elec. locomotive, excellent.
25 ton G. E. diesel-electric locomotive.
538 KVA G. M. diesel generator 900 hp 2400 v.
314 KW Cat. D-397 generator 3/60/440.
Three—American stiffleg derricks 836-80, 80' boom, 6 tons at 78' radius, 100 hp.
30 ton Lima & 25 ton Koehring truck cranes.
N. W. 80-D dragline, 8700 series .....$12,500.
P & H 1055 shovel-crane-dragline, 3½ yd.
Pioneer crushing plant 936 jaw & 3018 roll.
Iowa 1036 port. primary crushing plant.
Pittmaster plant 1016 jaw & 1616 roll.
54"x16' Stephens Adamson manganese feeder.
24"x1800' Barber Greene truss conveyor.
8" port. dredge, 20' ladder, cutter head.
1600 cfm compressor, 300 hp, 440 v.
I. R. compressor 16x10x7 model XLE.
Rex double pumpcrete model 200, 50 hp.
2—82 FD Euclid 15 ton and dump trucks.
16—Euclid 9 LDT center dump semi-trailers.
Mining—Construction—Quarry Equipment

STANLEY B. TROYER EQUIP. CO.
Box 97 **Phone 500** **Crosby, Minnesota**

FOR SALE

Gyratory Crusher—Size 8-K Allis Chalmers.
Traylor Smooth Rolls—30" dia. x 16" face
Superior Smooth Rolls (2) 36" dia. x 16" face
Marcy Rod Mill, 3' x 6' with 25 HP motor.
Abbe Pebble Mill, 3½' x 6' with Buhrstone lining.
Air Compressors Ing. Rand 1545 CFM@35 psi.
Ing. Rand 426 CFM @ 100 psi.
Schramm 315 CFM @ 125 psi.
Vibrating Screens, single deck:
3—Tyrock, 4 x 10 motor driven.
3—Tyler Hummer 4 x 10 magnetic shakers.
Conveyor Chain—Excellent Condition 10c per lb.
#4103 Rex pintle chain
#103 Rex hook chain
12" pitch roller chain.

SQUIRREL CAGE MOTORS

HP	MAKE	TYPE	RPM
300	IDEAL	DRIP PROOF	884
300	G.E.	I K	1160
200	G.E. (2)	SPLASH PROOF	1775
200	G.E.	I K - 12	575
150	G.E. (4)	K T 549	1760
150	WEST	HIGH TORQUE	870
150	G.E.	I K - 17	400
125	A.C.	OPEN	1760
100	G.E.	K T 524	3550
100	G.E. (2)	K T 542	1760
100	WEST	C S	1160
100	WEST	HIGH TORQUE	870
100	WEST	C S 584	690
75	A.C.	A R 444	3500
75	LOUIS ALLIS (2)	T E F C	1780
75	G.E. (2)	K - 505	1175

Many other smaller sizes in stock.

GEAR MOTORS, SPEED REDUCERS

hundreds of sizes and speeds in stock 1 HP thru 250 HP. Send for our list.

SLIP RING MOTORS

HP	MAKE	TYPE	RPM
350	WEST	C W	435
300	WEST	C W	1175
250	G.E.	I M	580
200	A.C.	ENCLOSED	575
150	WEST	C W	1160
150	WEST	C W	870
100	G.E. (4)	M	1750
100	G.E.	I M	1175
100	WEST	C W	870
100	G.E. (2)	I M	570
75	WEST (2)	C W	1175
75	G.E.	I M	720
75	WEST	C W	580

Write or Phone

L. J. Land, Inc.
P. O. Box 756 **Reading, Pa.**
Franklin 4-4953

Feel like a

new man . . .

KNOWING YOUR USED EQUIPMENT IS BEING ADVERTISED IN

PIT & QUARRY'S

Broadcast Section

TRACTORS — SHOVEL

Caterpillar	"D-6"	**Used** Tractor, S/N 9U-5482 (1950 model), w/Trackson Cable-controlled Hi-Lift Front End Loader. Excellent shape.
Caterpillar	"D-4"	**Used** Tractor, S/N 7U-21979SP, w/Trackson Hyd. Front End Loader. Excellent condition.
I-H	"TD-9"	**Used** Diesel Tractor w/Hough Hydraulic Front End Loader.
Terra Trac	"500"	Excellent used tractor w/hydraulic loader & hydraulic scarifier. 1200 hours.
Allis-Chalmers		**Used** R.T. Tractor w/Tractomotive Hyd. Front End Loader.

TRANSIT MIXERS

Rex	3-Yd.	Hi-Discharge (4¼ yd. Agitator) 1950 model, mounted Chevrolet 6400 Tandem axle truck.
Rex	3-Yd.	Hi-Discharge (4¼ yd. Agitator) 1950 model, mounted on 1950 Model LF172 Tandem Axle Truck.
Jaeger	3 Yd.	Hi-Discharge (4¼ yd. Agitator) repaired, blasted & painted. Mounted Chevrolet Tandem Truck.
Smith	3 Yd.	Hi-Discharge (4¼ yd. Agitator) mounted Chevrolet Tandem Axle Truck, low-priced.

CRUSHING EQUIPMENT

Universal	"916"	R.B. Jaw Crusher*.
Gruendler		Port. Pulverizing Plant, 3x8 feeder, "3XH" Mill, 20" belts, discharge conveyor, GM "671" diesel power, 9 months old.
Dixie		Port. Pulverizing Plant, 3x8 feeder, 3x8 Cedarapids screen, 3036 Dixie mill, 30" Underdischarge conveyor, GM "671" diesel power unit. 6 Years old. Completely overhauled.
Wisconsin-Foundry		Port. Gravel Plant, feed hopper, 9x36 jaw, 3018 roll, 4x8 2-deck screen, 24" conveyor, less power. Low priced.*
Austin-Western		Port. Gravel Plant, 1036 RB Jaw, reciprocating feeder, 3x8 2-deck screen, sand reject conveyor, 24" conveyor, steel wheels, D-8800 power unit.*
Gruendler		Port. Pulverizer Plant w/plate feeder, Simplicity 3x8 screen, Gruendler 24x24 mill, Cat D-337 power.*
Universal		Port. Pulverizer Plant, 2x6 feeder, 3x8 Simplicity screen, Universal No. 4 mill, Cat D-337 power.*
Pennsylvania		Used 3030 Hammermill, reversible, w/multi-speed sheaves & belts. Used very little. Good condition.*

NOTE: All This Equipment Located in our Yard except*.

EIGHMY EQUIPMENT COMPANY — **ROCKFORD, ILL.**
120 S. Pierpont — Phone 4-6706

FOR SALE OR RENT—EASY TERMS
Rebuilt — A-1 Condition
48B Bucyrus Erie Shovel, 2 cy Diesel
Northwest Model 6 Shovel, 1½ cy.
Caterpillar D8 Bulldozer
WILLIAMS CONSTRUCTION COMPANY
Box 145, Balto. 20, Md. — Murdock 6-6804

FOR SALE

10–30 cu. yd. Western Automatic Air Dump Cars—All steel—50-ton.
50–60-ton all steel Hopper Cars
50–70-ton all steel Hopper Cars
1–30-ton Plymouth Diesel Locomotive
1–35-ton Ohio Locomotive Crane

Phone — Wire — Write

HYMAN-MICHAELS COMPANY
108 N. State St. Chicago 2, Illinois
Phone: DEarborn 2-5422

FOR SALE

CRUSHERS

Cone, Symons, 3', 75 HP
Gyratory, Kennedy, No. 49, 100 HP
Jaw, Mitchell, 18" x 9", 25 HP
Double Roll, Gruendler, 24" x 24"
Ring roll, Sturtevant, 14" x 9½"
Babcock & Wilcox Type E32, 75 HP
Raymond, 6 Roll, Low Side, 200 HP

JUST PURCHASED

UNUSED Penna. Crusher Swing HAMMER MILL, Size 5060, series DNC. Traveling Breaker Plate. Requires 400 HP motor.

DRYERS

8' dia. x 70' L. Ruggles-Coles, Double Shell, Indirect-Direct heat
7' x 60', Vulcan Stone Dryer
9' dia. x 30', McDermott, Stainless Lined
5'6" dia. x 50', Renneburg, ⅝" Shell
6' x 50', Louisville

KILNS

8' x 115' Long—½" shell, 2 tires
5' x 40', Bros. Mfg., 10 HP
4' x 24' L, 5 HP

MILLS

Compeb, Allis Chalmers, 7' x 24', 450 HP
Ball Tube, Allis, 5'6" x 22', 150 HP
Rod, Marcy, 4' x 10', 75 HP

MISCELLANEOUS

Briquetting Presses, Komarek Greaves, 75 HP, 50 HP, 10 HP
Pug Mills, 25, 50, 150 HP
Conveyor, Trough, Screw, Bucket

PARTIAL LIST

SEND US YOUR INQUIRIES

PERRY EQUIPMENT CORP.
1414 N. 6th St. — **Phila. 22, Pa.**
POplar 3-3505

NEW RAIL
20# — 30# — 40#
IN STOCK
LEFTON INDUSTRIAL CORP.
***GENERAL OFFICE:* 212 Victor St.**
St. Louis 4, Mo.

FOR SALE

24 NEW HEIL EXTRA HEAVY DUTY DUMP BODIES WITH FULL CAB SHIELDS, CONSTRUCTED OF 8 GAUGE STEEL THROUGHOUT, CORRUGATED SUB FLOOR, EXTRA SCOOP END ATTACHMENT FOR TAILGATE. INSIDE BODY LENGTH 125 INCHES. INSIDE WIDTH 82 INCHES. INSIDE HEIGHT 23 INCHES. 5 YARD WATER LEVEL CAN BE BUILT UP TO 8 YARDS. COMPLETE WITH HEIL HEAVY DUTY TWIN 5 INCH HOISTS, 70 DEGREE DUMPING ANGLE WITH DRIVE LINE, UNIVERSAL JOINTS, LEVERS AND RODS. KNOW POWER TAKEOFFS FOR TANDEM OR SINGLE AXLE TRUCKS. WEIGH 4,621 POUNDS EACH. ACQUISITION COST OVER $2,100.00 EACH.

PRICED AT $875.00 EACH

BEN FISHEL AUTO. CO.
2114 SYCAMORE ST. - PH. 652 - CAIRO, ILL.
AL. FISHEL EQUIPMENT SALES CO.
1318 N. VANDEVENTER AVE. - ST. LOUIS 13, MO.
PH. JE. 5-4482

PACKAGE-DEAL

We are offering our complete Crushing and Screening Plant located at Massena, N.Y., for sale in one lot, as is, where is.

List of Equipment available upon request.

TECON CORP.
202 Davis Bldg. — Dallas, Texas
E. R. Funk — RI 8-1441

EQUIPMENT LOCATED

GA. - N. Y. - CALIF. - OHIO - TEXAS - ILL.

AIR COMPRESSORS

3—3078 CFM Inger. Rand 2300 V
5—1372 CFM Gardner Denver 2300 V
3—676 CFM Inger.-Rand 40T-440 V

DIESEL LOCOMOTIVES

8—Gen. Elec. 25 ton 44 ton 70 ton & 80 ton
3—Whitcomb 65 ton—1–115 ton G.E.
1—Davenport 20 ton Gasoline
1—6 ton 1—8 ton Brookville, 30 ton Plymouth

175 H.P. 3 DRUM ELEC. HOIST

175 H.P. 3 Drum Hoist, 25 HP. Swinger

STEEL SHEET PILING

1500 ton MZ 32, DP 2, AP 3, 30' & 60'

STEEL DERRICKS

Guy: 3 ton 85 ft. Boom, 25 ton 60 ft. Boom, 15 ton 100' Boom, 29 ton 115' Boom, 50 ton 100' Boom.
Stiff Leg: 5 ton 70 ft. Boom, 15 ton 100 ft. Boom, 25 ton 100 ft. Boom, 75 ton 135 ft. Boom. 1—5 ton 100 ft. Boom.

RAILWAY CARS

177—Dump Std. Ga. 20, 16, 12, 6 & 4 yd.
36—Flats—10 ton, 40 ton, 50 ton cap.
44—Tank Cars—8,000 & 10,000 Gal. Cap.
75—V Dump Cars, 1½ & 2 Yd.

GRINDING MILLS

10000 lbs. 1¼ in. Steel Grinding Balls
Ball Mills—4'6"x19', 6'7"x6', 6'x10', No. 77 and 6'6" x 14'6"
Hardinge Mills—5'x22", 7'x18" and 10'x36"
Special—NEW 8'x60" Hardinge Ball Mill
Rod Mills—3'x6', 3'x8', 4'x8', 5'x10', 8'x12'
Tube Mills—5'x22', 6'x22', 6'x6"x21' & 7'x18"

HAMMER MILLS

Jeffrey—15"x8", 24"x18" and 43"x36"
Pennsylvania SXT-B-48 THOR, SXC 13-58 Reversible and SXT-8
Cedar Rapids 5360H and 3030 Double Impeller Impact Breaker
Williams—GA-60 44"x60" feed opening

JAW CRUSHERS

Blake Type 56"x72", 48"x60", 36"x42", 40"x42" 36"x48", 30"x42", 30"x36", 15"x24", 48"x60"
Single Shaft 30"x42", 25"x40", 24"x36", 20"x36", 18"x24" and 10"x24"
Cam and Roller 16"x32", 14"x26", 11"x26", 10"x20" and 6"x20"

GYRATORY FINE REDUCTION

Symons 20", 3' and 4' stand. and 2' Shorthead
Kennedy 198, 258 and 378
Sup. McC. 6", 10" and 18"
Traylor 3 and 4' Type TY

GYRATORY PRIMARY

6", 10", 14", 16", 26" and 30" Sup. McC.
3, 4, 5, 6, 7½, 8, 9, 12 Allis-Chalmers Gates Style K
Telsmith 25B ANDIOA

ROTARY DRYERS AND KILNS

Dryers—4'x20', 5'-6"x50', 6'x50', 80"x60'
Kilns 4' x 20', 2 - 8' x 150', 7'6" and 9'6" x 200', 7'6" and 11'0" x 200'

WASHERS—CLASSIFIERS

4—78"x36'x6" Duplex Akins Spiral Classifier
Telsmith 20"x15' Twin Screw Sand Classifier and Size 10 Sand Tank
Eagle 20"x15' Single Screw Coarse Material Washer-Dewaterer
McLanahan—10"x30' and 12"x30' Log Washers

CEDAR RAPIDS SECONDARY PORTABLE CRUSHER

Model 2A, 24"x16" Rolls, 3'x8'—1½ Deck Screen, Roto elevator, 4 conveyors, gasoline engine on pneumatic tires

VIBRATING SCREENS

3 Scco 4x8 DD-5x12—3D Allis Chalmers

FEEDERS

Syntron Model F55 Grizzley Feeder
42" x 12' Linaman Apron Feeder
54" x 16' S-A Heavy Duty Feeder
60" x 15' Traylor Heavy Duty Apron Feeder

IDLE PLANTS BOUGHT

R. C. STANHOPE, INC.
60 E. 42nd St., New York 17, N. Y.
Tel: MU 2-3076

FOR SALE OR RENT

65 ton Whitcomb Diesel Elec. Loco.
44 ton Whitcomb Diesel Elec. Loco.
25 ton Davenport Gas-Elec. Loco.
50 ton American Guy Derrick, 115' Mast, 100' Boom
90 HP Lidgerwood 2d Diesel Hoist
150 HP Amer. #140 3d Gas Hoist
1½ yd. Lima 602 Crane, 110' Boom
3 yd. Manit. #3900 Crane, 100' Boom
2½ yd. Link-Belt K-595 Crane, 120' Bm.
110 HP Clayton Port. Steam Generator
5 yd. Bucyrus 120B Electric Dragline

WHISLER EQUIPMENT CO.
1905 Railway Exchange Bldg., St. Louis 1, Mo.
CHestnut 1-4474

QUARRY EQUIPMENT

Cedarapids 2540 jaw crusher. Reconditioned.
Cedarapids 3042 double impeller. Rebuilt.
Cedarapids 1036 roller bearing jaw crusher.
Cedarapids 2033 hammermill. Rebuilt.
Telsmith 24" cone crusher. Good.
Cedarapids 4' x 12' double deck Screen. Rebuilt.
Telsmith 13B gyratory crusher.
Cedarapids 42" x 10' apron feeder. New.
Robins 4' x 9' triple deck screen. Reconditioned.
New Holland 4' x 12' double deck screen. Rebuilt.
Pioneer 4' x 8' double deck screen. Rebuilt.
Smithco 24' x 60' portable belt conveyor.
27½ ton, single-compartment 8' x 12' bin.
60-ton, two-compartment, 8' x 18' storage bin with slam gates.
100-ton, two compartment, 13" x 23' bin.
Sneral bins to your specifications.
Conveyors—18"—24"—30"—36". Also conv. belting.

SHOVELS AND CRANES

Lorain 820 2-yd. diesel shovel-crane.
Lorain 82 2-yard diesel shovel.
P&H 855B-LC, 2-yd. diesel dragline.
Lorain 72, 1½-yd. Diesel Dragline.
Lorain 79-J 1½ yd. diesel dragline.
Lorain 79 1½ yd. diesel shovel.
P&H 655B 1½ yd. diesel dragline.
Bucyrus-Erie 38B, 1½-yard diesel dragline. Rebuilt.
Lorain L-26, ⅝-yd. Diesel Clam-Drag.
Lorain L-25J ¾-yd. diesel clam-hoe.
Lorain L-41 ⅝-yd. diesel backhoe.
Link Belt LS-85 ⅝-yard diesel shovel-drag.
Lima 24 Paymaster ⅝-yard diesel shovel. Good.
Colt 1020 ⅝-yard diesel powered shovel-crane.
Lorain TL25S ⅝-yard gas clam-crane.
Insley K-12, ½-yd. Gas Clam-Crane.
Insley K-12 ½-yd. gas dragline. As Is.
Koehring 304 ¾-yd. diesel shovel.
Koehring 304 ¾-yd. diesel backhoe.
2—Lorain MC-414 20-ton Moto-Cranes.
Link Belt HC-30 25-ton truck crane.
Lorain MC-504W 25-ton Moto-Crane.
Lorain MC-4 15-ton Moto-Crane.
2—Lorain TL-20 10-ton gas Moto-Cranes.
Lorain SP-107, 7-ton self-propelled crane.

TRACTORS, TRUCKS, SCRAPERS, ETC.

3—Euclid TS-18 twin engine scrapers.
4—Euclid TS-24 twin engine scrapers.
4—Euclid 18-yd. overhung engine scrapers.
1—Euclid 15½-yd. six wheel scraper.
1—Euclid TC-12 twin engine tractor.
10—Euclid 22-ton rear dumps. Excellent.
1—Mack LRS 15-ton rear dump. Rebuilt.
1—Euclid tractor with 3200 gal. water tank semi-tlr.
1—Pullman S-600, 6 to 8 yard scraper.
1—Caterpillar DW-10 scraper.
1—International TD-14A tractor with PCU.
1—International TD18 with Bucyrus-Erie bulldozer blade. Excellent condition.
1—Caterpillar D-4 TRACTOR ONLY.
1—Caterpillar D-7 with cable bulldozer blade.
1—Austin Western diesel powered grader.
1—International 300 tractor, with loader, backhoe.
1—LaPlante Choate 13¾-yd. cable scraper.
1—Ateo H85, 19½-yd. Hydraulic Scraper.

SHOVEL ATTACHMENTS

Lorain 820, 2-yd. 23' boom, 21' stick.
Lorain 50, 1-yd. 21' boom, 17' stick.
Lorain 40, ¾-yd., 19' boom, 16' stick.
Lorain 30A, ½-yd., 16' boom, 13'4" stick.
Osgood 903, 2-yd., 24' boom, 20'6" stick.

BACKHOE ATTACHMENTS

Lorain 40A, 18' boom, 7' stick, 28", 36" or 44" bucket.
Koehring 304, 19' boom, 5' stick.

DIESEL POWER UNITS

Cat. D7700, 74 H.P. at 1000 PFM. Rebuilt.
Cat. D8800, 88 H.P. at 1000 RPM.
Cat. D13000, 128 HP. at 1000 RPM. Rebuilt.
GMC Twin Diesel, rebuilt.
GMC 3021C, 3-cylinder, new.

AIR COMPRESSORS

105 cu. ft. Leroi Tractair with dozer, backhoe.
105 cu. ft. Ingersoll-Rand gas portable.
125 cu. ft. Jaeger gas portable.
210 cu. ft. Gardner-Denver gas portable.
315 cu. ft. Schramm gas portable.
500 cu. ft. Ingersoll-Rand, Waukesha power.
600 cu. ft. Gardner-Denver diesel portable.
420 cu. ft. Gardner-Denver 2-stage stationary. Rblt.

L. B. SMITH, INC.
Camp Hill, Pa.
Phone Harrisburg REgent 7-3431

FOR SALE

Concrete Plant. 4 comp Johnson bin 3 agg 1 cement This plant complete in every respect and equal to new. Capacities on agg 150 ton Cement bin 250 bbl and cement silo 600 bbl and under track hopper 400 bbl. total 1250 bbl storage cement screw and elevator one agg conveyor 24 in x 240 ft long complete 2¼ yard batcher, with all dial scales one conveyor 30 in x 160 ft complete. This plant batched only 28,000 yds of concrete on one job. Now dismantled on ground and ready to be loaded on your truck. Cost new in 1955 $67,000. selling price $21,000. located near Philadelphia, Pa. This plant purchased by us for a job that fell through.

WIVCHAR READY MIX CORP.
P. O. Box 461
Tel. Park 7-4177 Riverhead, L.I., N. Y.

FOR SALE BY OWNER

APRON PAN FEEDER—48"x110'—with Jones gear reducer drive. Heavy Duty—designed for 1000 TPH.

2—HEAVY DUTY SCALPING SCREENS—6'x14' —Single Deck—Hewitt-Robins with 25 HP Motors.

60" BELT CONVEYOR—200' C. to C.—Including belt—idlers—framework—head & tail pulleys—takeup pulleys.

2—ROBINS VIBREX SCALPING SCREENS—6'x12' with 15 HP Motors.

1—60" BELT CONVEYOR—170' C. to C., Incl. belt—idlers—framework—head & tail pulleys, etc.

All in excellent condition.

Jos. Banks Construction Co.
303 Market St., Kingston, Pa.

FOR SALE

Used 9 K Gyratory Crusher A.C.
Spare Parts Included

GARY SLAG CORPORATION
Wab. 2-4082
542 So. Dearborn St. Chicago 5, Ill.

FOR SALE

1—100 H.P. Electric Caisson Pump
No. 2 Drop Forged "C" Clamps, $2.00 ea.
2" Galvanized Clevises, 22¢ ea., $3.00 ea.
Model 25 Northwest Shovel Front, Unused—$750.00
4—Pressure Type Entrained Air Indicators
4—Portable American Beam Testers.

CARL NUSSBAUM, JR.
9907 Preston Hwy., Louisville 19, Ky., SPring 6-0071

FOR SALE

1—Williams 4-roll Mill (Gnome Size), Complete.
1—Raymond 3-roll High Side Mill, Complete.
1—Bartlett & Snow Rotary Dryer, Size 54" x 36' x 6' with Roller Trunnions, 10 HP Explosion-proof motor and Reeves Varispeed Drive.
2—Louisville Rotary Dryers, 6' x 45'.
2—Columbia Engineers Rotary Dryers, 6'4" x 45'.

R. GELB & SONS, INC.
U. S. Highway 22, Rahway Valley R. R.
UNION, N. J. MURDOCK 6-4900

MODERN STONE CRUSHING PLANT: Complete with 25 x 40 roller bearing Jaw Crusher, two 36" and one 24" Cone Crushers, 4 x 8, 3 deck Screens, Belt Conveyors, Apron Feeders, Truck Scale, Magnetic Pulley, all motors, controls, with or without trucks and shovels.

ROTARY KILNS & DRYERS: 4½' x 40 ft., 5' x 50 ft. and 8' x 40 ft. Rotary Kilns, all modern, gas fired, complete with all equipment, including instruments and controls. One 9 ft. x 120 ft., two 8 ft. x 125 ft. Two 7' x 80' Dryers, ½" shell, with steel liners and lifters. One Ruggles Coles class XH12, 80" x 60 ft., new 1955. One Ruggles Coles class XA, 5 ft. x 30 ft. One 6 ft. x 50 ft. Rotary steam Dryer and one 6' x 50 ft. rotary Cooler. One kiln 10 ft. dia. x 210 ft., ¾" plate.

PULVERIZERS: Hardinge Conical Ball Mills—8 x 36", 8 x 48", 10 x 48", with 200, 250 and 350 synchronous motor. One 6'6" x 21 ft. Tube Mill, stone lined with or without synchro motor and controls. 2—7' x 24' Ball Mills with 400 H.P., 200 RPM, synchro motor, 440 volt, 60 cycle, 3 phase.

JAW CRUSHERS: 10 x 15, 10 x 20, 12 x 24, 15 x 36, 24 x 36, 25 x 40, 30 x 42 and 40 x 42". One 18 x 30" and one 24 x 72" sectionalized for underground use.

CAR DUMPER: Link Belt standard gauge, 65 ft. table.

AIR SEPARATORS: Sturtevant 16 ft.

MINE HOISTS: One 10" dia., 10' face, double clutched drums, 1250 H.P., 1⅜" rope, 1200 FPM, complete with all controls, excellent condition. Other hoists 100 H.P. to 2500 H.P.

WE BUY AND SELL EQUIPMENT
THROUGHOUT
NORTH AND CENTRAL AMERICA

A. J. O'NEILL
Lansdowne Theatre Building
Lansdowne, Pa.
Phila. Phones: MAdison 3-8300—3-8301

36"x48" Jaw Crusher—EXCELLENT
3' Traylor Reduction Crusher
3'x10' 3-deck Vib. Screen
22"x40" R/B Roll Crusher—EXCELLENT
30,000 CFM Blowers—5' dia. x 6'
75 & 150 HP Self-contained Boilers
3—24"x250' Belt Conveyors w/motors
350 HP 2300 V. Mtrs. 1200/1800/3600 RPM
365' & 600' Portable Diesel Compressors
H. & P., 6719 Etzel, St. Louis 14, Mo.

FOR SALE
ONE BRAND NEW 16" SUPERIOR McCULLY GYRATORY CRUSHER. NEVER BEEN USED AND ONE SLIGHTLY USED DUE TO CHANGE OF PLANS
DOLESE & SHEPARD CO.
Route 66 and East Ave., Hodgkins, Ill.
Phone: Fleetwood 4-2800 • Ask for MR. DOODY

"FASTER FROM FOSTER"
RAIL
& ALL TRACK EQUIPMENT
Nation's Largest Warehouse Stocks
L. B. FOSTER CO.
PITTSBURGH 30 • ATLANTA 8 • NEW YORK 7
CHICAGO 4 • HOUSTON 2 • LOS ANGELES 5

FOR SALE OR RENT

STIFFLEG DERRICKS

ALL AMERICAN DERRICK OUTFIT

1—Mdl 836-80 all steel American Derrick, 80' boom 16' bull wheel, 36' mast, 32' sills 44' stiffleqs. Foot block arranged for bucket handling. 15-ton cap.
1—Mdl 100 3DE American 3 Drum Hoist with attached swinger. 125 HP G. E. motor 220/440-v. Line pull—10,000# @ 335 FPM.
Complete American Unit for lifting or clamshell work.
Like new condition—Ready to go!

1—10-ton American Terry all steel stiffleq derrick, 30' mast, 50' boom. 27'5" sills, 38' stiffleqs, 12' bull wheel. 7-part boom line, 5-part load line. Cap. 10 tons @ 28', 6 tons @ 48' rad.
1—12½ ton Virginia Bridge all steel stiffleq derrick, 75' boom, 30' mast, 25' sills, 39' stiffleqs, 12' bull wheel. Legs adjustable from 50° to 120° rad. Cap. 23,000# @ 25', 10,000# @ 50', 5400# @ 75' rad.
1—4-ton Virginia Bridge all steel stiffleq derrick, 45' boom, 12'6" mast, 15' sills, 21' stiffleqs, 5' bull wheel. Legs adjustable from 50° to 120° rad. Cap. 4 tons @ 28' rad.

GUY DERRICKS

3—20-ton American Terry steel erector type Guy Derricks, Mdl 2-100. Cap. 20 tons @ 50', 10 tons @ 98', 110' mast, 100' boom. 5-part boom and load lines. Roller bearing foot block.
1—15-ton American Terry steel erectors type guy derrick Mdl 1-85. Cap. 15 tons @ 30', 10 tons @ 50', 6 tons @ 83' rad. 100' mast, 85' boom. 5-part boom and load lines. Roller bearing foot block.

Complete line of 2 and 3 drum hoists with attached or independent swingers. (gas—diesel—electric—steam). Line pull range from 3500# to 12,000#.

Call your nearest E.C.A. office for full information on rental or purchase of all types hoisting equipment.

EQUIPMENT CORPORATION OF AMERICA

CLIFTON HEIGHTS, PA., Box P608, Sub. of Phila.
GROVETON, PA., Box 43-P, Sub. of Pittsb.
CHICAGO 4, ILL., 327P So. LaSalle St.
NEW YORK 7, N.Y., 30-P Church St.

FOR SALE

2½ Yard Sauerman Slackline Cableway Excavator. 10 inch Dredge with 55 ft., and 120 ft. Swintek Ladders.

DAKOTA SAND & GRAVEL CO.
Box 22, Bismarck, No. Dak.

FOR SALE

One 34E dual drum Koehring paver in good condition $12,000
Two two cu. yd. Smith mixers. Each 250
One 28' by 66" Asphalt dryer 3,500
One Clarage #137 fan used only 250 hours (64" wheel) 1,800
One American Blower fan, 50" wheel 450
One American Blower high pressure blower with fluid drive and Hauck 758 combination oil and gas burner. This burner operates on #2 gas pressure. 60 hp. electric motor included 1,200

WANTED

One 4 by 10' Robbins vibrex screen with two decks
One 150 hp. electric motor at 1200 rpm. Also starter. 220 volt
One 100 hp. electric motor at 1800 rpm. Also starter. 220 volt
Jeffrey vibrator feeders capacity fifty tons to two hundred per hour.

TYLER READY-MIX CONCRETE & ASPHALT CO.
P.O. Box 1046 **Tyler, Texas**

OUR 50TH YEAR

SPEED REDUCERS FOR SALE

MAKE	RATIO	H. P.
Cleveland 500 AT	28. 5–1	30
Cleveland 400 AT	42 – 1	15
Cleveland 400 AT	32 – 1	17.5
Cleveland 400 AT	26. 5–1	22
Cleveland 300 AT	62 – 1	6
De Laval	40 – 1	10
De Laval	11 2/3–1	28
Phila. 1075 AT	17 1/2–1	35
D.O. James	31 – 1	7.5
D.O. James	38 – 1	10
D.O. James	46 – 1	7.5
Jones	48 – 1	3.3
Jones	25 – 1	34
Winsmith	12. 5–1	10
Winsmith	36 – 1	6

PARALLEL SHAFT TYPE

Stephens-Adamson	10 – 1	35
Jones	21 – 1	26
Jones	42 – 1	10
Koppers	21 – 1	25
Koppers	17. 5–1	25
Koppers	38 – 1	40
Koppers	21 – 1	40
Koppers	17. 5–1	25
Koppers	27 – 1	25
Falk	8.93–1	50
Falk	8.93–1	40

G. A. UNVERZAGT & SONS INC.
136 Coit Street Irvington 11, N. J.
Essex 3-8105

ATTACHMENTS AVAILABLE

Northwest - Bucyrus-Erie - Lima - Marion - Link-Belt - Lorain - P&H - Manitowoc - Shovels - Backhoes - Clam Drag - all sizes.

James C. French
226 Berry Pkwy. - TAlcott 3-4927
P. O. Box 188 - Park Ridge, Illinois

FOR SALE

1—Koehring 501—1¼ yard dragline, 50' boom, good condition. $7800.00.
1—48B B.E. 2 yard shovel plus 75 foot dragline boom. Excellent condition, completely rebuilt. With engine $22,000.00. Without engine $17,000.00.
1—Wemco model SH manganese sand screw, 48" diameter screw 20'3" long. Excellent condition.
1—Dredge Hull 16' wide x 42' long x 4½' hull, depth 29' rotary cutter, ladder with hoist for ladder and spuds. Without pump or engine $12,500.00.
1—Northwest 25 shovel attachment complete with ¾ yard bucket. Like new.
1—Page Engineering dragline, 6 yard. Year 1943, Serial 197. $95,000.00.
1—C450 Pennsylvania reversible hammermill. 6 rows of hammers, 8 hammers per row. Trojan center feed. Wgt. 13,000.
1—54B B.E. shovel with less than 1,000 hrs. Diesel powered. Perfect condition.

P. O. BOX 513 - PEORIA, ILLINOIS

CRUSHERS: 10x36, 15x38 Telsmith, 10x28 Linnmann, 24x36 CR w/3x8 feeder, 30x42 Universal all RR, 28x36 Traylor blake type JAW, 13B, 24", 28", 36" Telsmith, 2'4", 20", 4' Traylor, 10, 16, 36" McCully, 25½, 37½, 38½ KVS GYR. Rolls and Cones.
CRUSHING PLANTS: Univ. 546P 2026, CR Jr. & Super, AW2540 & AW81.
DRYERS: 4½x36, 5x40, 6x50, 7x80, 8x124.
CONVEYORS: 24x76, 24x90, 24x270, 36x151, 42x160, 24x1800.
MILLS: 4½x16", 6x48", 7x36" Hardinge conical, KVS 4x6 Allis 6x15 Ball, Raymond 66" Roll Rod Tube & Hammer.
Wellman Seaver Morgan 2 drum 300 HP & Link Belt 300 HP Slope HOISTS.
25 ton G.E. Diesel Elec. Locomotive.
435 KW & 938 KW Diesel Generator SETS.
Three Stiff Leg DERRICKS, 8 ton at 75' radius.
SHOVELS, DRAG: NW80D, Marion 40A, Lorain 77,820, Lima 1201, BE320B, 9W.
Repres: Bonded Scale and Machine Co.

MID-CONTINENT EQUIPMENT CO., INC.
8321 Gannon St. Louis 24, Mo. Wydown 1-2826

LIQUIDATION

DONORA ZINC WORKS

Donora, Pennsylvania

(In Conjunction with Kaiser Nelson Co.)

KILNS, DRYERS & FURNACES

1—Traylor 10' x 120' Rotary Kiln.
2—Ruggles Cole 90" x 55' Rotary Dryer.
1—Christie 80" x 65' Rotary Dryer.
2—Herresoff Furnaces, 20' dia. 16 hearth.
1—Herresoff Furnace, 16' dia. 10 hearth.
10—Batch Cadmium Tilting Furnaces.

CONVEYORS & FEEDERS

2—Rubber Belt Conveyors 24" x 315' and 24" x 175' c.c.
30—Rubber Belt Conveyors 18" and 24" x 40' to 80' a.c.
3—Belt Apron Feeders 84" x 22', 48" x 50'.
10—Bucket Elevators, 30' to 80' c.c.
800'—12" to 18" Screw Conveyors with drives.

CRUSHERS, MILLS & SCREENS

5—54" x 24", 48" x 24" Roll Crushers.
1—Hardinge 5' x 10' Rod Mill.
1—Ball Mill 4' x 6'6".
3—Jaw Crushers, 20" x 6", 9" x 15", 5" x 10".
3—Kennedy #3 and #6 Gyratory Crushers.
1—Symons 30" Impact Crusher, 50 HP.
5—Screens, Symons, Tyler, 4' x 5', 3' x 12'.

BINS & HOPPERS

100—Steel Bins and Hoppers, 50 ton to 500 ton capacity, single and multiple compartment, with structural steel supports.

FILTERS & CLASSIFIERS, etc.

2—Dorrco 14' x 8' Internal Drum Type Filters.
3—Dorrco 6' x 3' Internal Drum Type Filters.
1—Dorrco 3' x 18' Rake Classifier.
20—Dorrco, LaBour, Wilfley Acid Pumps.
2—two section Cottrell plate and wire type Precipitators.
1—five section Cottrell round tube and center wire type Precipitator.

MISCELLANEOUS

Mine Hoists; Larry and Transfer Cars; Rail; Structural Steel; Steel Buildings; Air Compressors; Vacuum Pans; Centrifugal Pumps; AC and DC Motors; 1 to 150 HP; Speed Reducers; Ammonium Chloride Evaporators; Lead lined and Steel Tanks, 1000 to 50,000 gal.; Agitators.

Your Inquiries Solicited. Send for Circular.

BRILL EQUIPMENT COMPANY

2401 Third Ave., New York 51, N. Y.
or DONORA, PA. Tel.: FRONTIER 9-9789
(25 miles from Pittsburgh)

POWER EQUIPMENT CO.
Offers

BARGAIN PRICES

ON GUARANTEED NEW and Rebuilt MOTORS!

JULY SPECIALS

GUARANTEED REBUILT MOTORS
220/440 V. 60 Cycle—3 Phase

HP	MAKE	TYPE	SPEED
400	West. SB-Open	CS	900
300	FM-BB-Open	H	1800
300	West.-BB-Drip	CS-875C	1200
300	West.-SB-Open	CS	720
300	West.-SB-Open	CS-1002	600
250	GE-TEFC BB	K-6335	1800
200	Cont. TEFC BB	NP-686C	1800
200	FM-BB-Open	H	1800
200	GE SB Open	IK	1200
200	Eng. Elect. B.B. Open	P-125.5	720
150	GE-TEFC BB-XP	K-6328	3600
150	West. SSB-Open	CS-761C	1800
150	GE-SB-Open	IK	1800
150	West BB Open	CS771C	1800
150	Cont. TEFC BB	NF-743X	900

Send for our FREE Catalog

Cash for your surplus new & used electric equipment. Send your list today.

Large line of motors, control equipment, AC & DC Generators, MG sets and transformers.

Phone or Wire Us Collect

POWER EQUIPMENT CO.
8 Cairn St., Rochester 2, N. Y.
Phone BEverly 5-1662

INDEX TO *Broadcast Advertisers*

Banks Const. Co., Jos. 270
Blue Ball Machine Works 272
Bonded Scale & Machine Co. 267
Brew, Woltman & Co., Inc. 268
Brill Equipment Co. 271

Corson, Inc., G. & W. H. 272

Dakota Sand & Gravel Co. 271
Dolese & Shepard Co. 270

Eighmy Equipment Co. 269
Electric Equipment Co. 273
Electric Service Co. 266
Equipment Corp. of America 271
Euclid Tennessee, Inc. 272

Farley Equipment Co. 265
Fishel Equip. Sales Co., A. L. 269
Forman, Gilbert 266
Foster Co., L. B. 270
French Co., James C. 271

Gary Slag Corp. 270
Gelb & Sons, Inc., R. 270

Hanson, Sr., Wm. 266
H & P Machy. Co. 270
Heat & Power Co., Inc. 273
Heidenreich, Jr., E. Lee 266
Heineken, Inc., W. P. 268
Hyman-Michaels Co. 269

Land, Inc., L. J. 268
Landi & Sons, Inc., T. 267
Lefton Industrial Corp. 269
Lofstedt, Carl J. 266
Loofbourow, R. L. 266
Lubrecht, III, Wm. 268

Malden Equip. Corp. 266
Meissner, Inc., John F. 266
Memphis Equipment Co. 273
Mid-Continent Equip. Co., Inc. 271

New Jersey Drilling Co. 266
New York Trap Rock Corp. 272
Nussbaum Electric Co. 273
Nussbaum, Jr., Carl 270

O'Neill, A. J. 270

Pennsylvania Drilling Co. 266
Perry Equipment Corp. 269
Power Equipment Co. 272
Process Plants Service, Inc. 273

Reid-Holcomb Co., Inc. 273

Smith, Inc., L. B. 270
Stanhope, Inc., R. C. 269
Swabb Eqpt. Co., Inc., Frank 266

Tampa Armature Works, Inc. 272
Tecon Corp. 269
Texas Equipment-Rentals, Inc. 273
Thomasville Drilling & Testing Co. 266
Tractor & Equipment Co. 267
Troyer Co., Stanley B. 268
Tyler Ready-Mix Concrete & Asphalt Co. 271

Union Mining Co. 273
Unverzagt & Sons, G. A. 271

West Tenn. Limestone Co. 266
Whisler Equipment Co. 269
Williams Construction Co. 269
Wivchar Ready-Mix Corp. 270

WANTED

Rotary Kilns and Dryers,
All Sizes, any make.

Box No. PQ-8073, c/o Pit and Quarry Publications
431 S. Dearborn St. Chicago 5, Ill.

FOR SALE

3—29-T BUCYRUS-ERIE Wire Line Blast Hole Drills
2—42-T BUCYRUS-ERIE Wire Line Blast Hole Drills
1—New RCA Metal Detector—10" x 36" Aperture
1—FULLER-KINYON System
1—Second-hand Drop Ball (3200#)
9—New Well Drill Bits—3¼" x 4¼"—7 API Joints
2—PENNSYLVANIA, Class DE-2, two stage, duplex, cross compound (direct connected), Synchronous Motor Driven Air Compressors.
Low Pressure Air Cylinder Diameter 20"
High Pressure Air Cylinder Diameter 12"
Stroke 14"
1—4' x 6' KENNEDY VAN SAUN Double Deck Vibrating Screen.

NEW YORK TRAP ROCK CORP.
Old Mill Road - West Nyack, N. Y.
Telephone - NYack 7-4500

FOR SALE

One Used Model MR No. 40—16 x 20 Day Pulverizer, s/n 7238. Excellent Condition with Six Groove (6) 20 PD Sheave on Skid Frame With Motor Mount, Less Motor. New Grate Bars, Hammers and Breaker Plates.
FOB Our Yard Nashville, Tennessee $1,250.00
EUCLID-TENNESSEE, INC.
P.O. Box 1176 Nashville, Tennessee

FOR SALE

48"x60" Allis Chalmers Blake Jaw Crusher
36"x48" Buchanan Blake Jaw Crusher
30"x36" Traylor Blake Jaw Crusher
10"x36" Buchanan Blake Jaw Crusher
12"x24" Buchanan Blake Jaw Crusher
10"x20" Power Blake Jaw Crusher
24"x36" Farrell 14H Blake Jaw Crusher
3—24"x54" Allis Chalmers Rolls
22"x36" Telsmith over head eccentric Jaw Crusher
18"x32" Ditto
9"x36" Ditto
10"x36" Ditto
2—28" Telsmith Intercone Crushers
36" Telsmith Gyrasphere Crusher
36" Symons Cone Crusher
16"-40" Good Roads Jaw Crusher
18"x30" Telsmith rolls, smooth shell
16" Telsmith Gyratory Crusher
22" Telsmith Gyratory Crusher
13" Telsmith Gyratory Crusher

BLUE BALL MACHINE WORKS
Blue Ball, Pennsylvania

FOR SALE

TRAYLOR 7'0" x 35'0" BALL MILL

Complete with 700 H.P. Synchronous motor, control and magnetic coupling. Numerous spare parts and feeder. Unit in excellent condition.

TAMPA ARMATURE WORKS, INC.
P. O. Box 3381 TAMPA, FLORIDA

COLLECTOR—#15 Ducon Cyclone 11,000 CFM 3/16 Plate
HAMMERMILL—S-6 Penna. 42" x 32"
ELEVATOR—90' Open Inclined with buckets between two strands of chain
SCREEN—5' x 7' Rotex Sifter Model 421
SHOVEL—L57 Lorain 1-¼ Yd. Real good condition
SEPARATOR—Dings Magnetic Cross Belt for granular materials
MOTOR—200 HP, 875 RPM GE Slip Ring 440/3/60

G. & W. H. CORSON, INC.
Plymouth Meeting, Pa.

COMPLETE CONCRETE PLANT

1—Complete concrete plan—175 tons, 4 compartment aggregate bins with 3 yd. batcher, scales and bucket elevator, 600 bbl. cement silo with batcher under track screw conveyor and bucket elevator.

Available immediately, Located in Colorado

PHONE OR WRITE:

Memphis Equipment Co.
766 S. Third St. JA. 5-7841
Memphis, Tenn.

MOTORS AND GENERATORS

All sizes, new and rebuilt. Starters, accessories, pulleys and repair parts. Gear motors, Falk Shaft mounted Speed Reducers, couplings and V-belt drives.

EXPERT REPAIR SERVICE

NUSSBAUM ELECTRIC CO.
220 E. Douglas Avenue Fort Wayne, Ind.

USED QUARRY AND GRAVEL EQUIPMENT

600 Compressors
Mobile Wagon Drill
Robbins 2 Deck Screen
H & B 6" Gravel Pump
Haiss 77 Loader
Rebuilt GM Diesel Engines

Reid-Holcomb Company, Inc.
Indianapolis, Indiana
MElrose 2-4433

FOR SALE

KILNS—COOLERS—DRYERS

9' x 125' x 11/16" Rotary Kiln 30 HP
8' x 50' Allis Chalmers Oil Fired 20 HP
6' x 50' Rotary Dryer
6' x 30' Rotary Cooler
4' x 20' Ruggles Cole XH2 Dryer
502-16 & 705-24 Roto Louvre Dryers
104" x 70' Ruggles Cole Dryer

CRUSHERS & MILLS

48" x 60" Allis Chalmers Jaw Crusher
36" x 48" Buchanan Jaw Crusher
Robinson #13 Saw Tooth 15 HP
Jeffrey Hammermills, 24"x18", 20"x12", 15"x8"
Pennsylvania C-3-30 Hammermill, 60 HP
#60 Williams Hammermill
Raymond 3 Roll High Side Mill with Double Whizzer, Fan and Dust Collector
24" x 10' Pug Mill 30 HP

MISCELLANEOUS

18 Bins, 15 to 200 ton
(4) 24" x 550' Belt Conveyors
42" x 500' Apron Conveyor, Mesh belt
4' x 6' & 4' x 8' Hummer Single Deck Screens
18" x 16', 26" x 6', 48" x 8' Apron Feeders
Rotoclone Dust Collector Size 36 Type W
26" x 27' Drag Conveyor 10 HP

HEAT & POWER Co., Inc.
ROCK PRODUCTS EQUIPMENT DIV.

60 EAST 42nd ST. | 310 THOMPSON BLDG.
NEW YORK 17, N.Y. | TULSA 3, OKLAHOMA
MUrray Hill 7-5280 | Diamond 6-4890

FOR SALE

Current model 375 KVA, or 300 KW Generator set. Powered with twin 6110 GMC diesel engines, with air and electric starters. Complete switch gear and extra exciter. This unit has operated less than 4000 hours and is in excellent condition . . . New cost $30,000 our price $20,000 f.o.b. truck near Slaton, Texas.

TEXAS EQUIPMENT RENTALS, INC.
P. O. Box 918, Austin, Texas
Phone - Greenwood 6-3918

FOR SALE

Hardinge Conical Ball Mills, 4½' x 16", 5' x 22"; Kiln, 2' x 18' Gas Fired, Brick lined; Reliance 12" Jaw Crusher.

PROCESS PLANTS SERVICE, INC.
267 Central Ave., Clark, N. J.
Phone, Fulton 1-1103-4

FOR SALE

1—24"x36" Superior Jaw Crusher No. 35243. Reconditioned. Good as new.

1—36"x14'3" Telsmith Apron Feeder. New. Never taken out of crate.

UNION MINING COMPANY
First Nat'l Bank Bldg. Pittsburgh 22, Pa.

MOTORS • GENERATORS
TRANSFORMERS
NEW • REBUILT
WORLD'S LARGEST INVENTORY
ELECTRIC EQUIPMENT COMPANY
Phone Station Collect GL 3-6783
P.O. Box 51, Rochester, New York

PIT & QUARRY HELPS YOU OPERATE MORE PROFITABLY

Every issue of PIT AND QUARRY is full of information you can use in your business. It gives you practical ideas on every phase of your operation.

Reading PIT AND QUARRY is like having a conference every month with the leading men in your industry. You don't have to stir out of your chair to get information that otherwise would take you years to obtain by your own efforts and experience.

The cost of this service is only $3.00 a year. Start your subscription at once by mailing your remittance to Pit and Quarry Publications, Inc., 431 S. Dearborn St., Chicago 5, Ill.

Index to Advertisers

A

*Allen-Sherman-Hoff Pump Co. 65
*Allis-Chalmers Mfg. Co. 18-19, 62, 196-197
Allis-Chalmers Mfg. Co. Construction Machinery Division 66-67
Alloy Rods Co. 57
American Cyanamid Co. 210
American Hoist & Derrick Co. 252, 261
*American Manganese Steel Div., American Brake Shoe Co. 258
*American Pulverizer Co. 165
*American Steel & Wire Div., U.S. Steel Corp. 217
Anaconda Wire & Cable Co., Sub. of Anaconda Copper Mining Co. 275
Arcair Company 262
*Armco Drainage & Metal Products, Inc. 13
Atlas Powder Co. 245
Austin Powder Co. 52

B

*Bailey Meter Co. 134
*Barber-Greene Co. 96
Baughman Mfg. Co. 146
*Bemis Bro. Bag Co. 173
Bendix Aviation Corp., Cincinnati Division 72
*Bethlehem Steel Co. 277
*Bin-Dicator Company 252
*Birdsboro Steel Foundry & Machine Co. 94
Boston Woven Hose & Rubber Co. 194
Bradley Pulverizer Co. 118
Broadcast Section 265-273
Bucyrus-Erie Company 219
*Buell Engineering Co., Inc. 104-105

C

Calumet Division 31
Campbell Chain Co. 170
Cape Ann Anchor & Forge Co. 26
Caterpillar Tractor Co. 82, 83
Chicago Pneumatic Tool Co. 22
Cities Service Oil Co. 68
*Coates Steel Products Co. 115
*Colorado Fuel & Iron Corp. 243, 264
Columbia Steel Casting Co., Inc. 35
*Combustion Engineering, Inc., Raymond Division 132-133
Crescent Belt Fastener Co. 27
Crosby-Laughlin Division, American Hoist & Derrick Co. 252
Crown Zellerbach Corp. 74

D

*Deister Concentrator Co. 246
Dewey & Almy Chemical Co. 84-85
*Diamond Iron Works, Inc. 15
*Dorr-Oliver, Inc. 152
Dracco Corporation 69
Drott Mfg. Co. 223
Du Pont de Nemours & Co., E. I. 206

E

*Eagle Crusher Co. 49
*Eagle Iron Works 25
Easton Car & Construction Co. 99
Eaton Mfg. Co. 40
Eimco Corporation 207
Ensign-Bickford Co. 213
Euclid Division, General Motors Corp. 73

*See also Detailed Information in 1957 Pit and Quarry HANDBOOK and CONCRETE INDUSTRIES YEARBOOK.

Enter 275 on card, page 211 →

Will your shovel keep on working when its

CABLE'S ON THE ROCKS?

When the going is soft, *any* shovel cable may do. But the going is more often rough than easy—and not all shovel cables perform alike! They are not made alike.

Anaconda SH-D Shovel Cable, for example, is made by people who know mining problems firsthand—we're miners ourselves.

The insulation is a special high-grade butyl that withstands ozone, heat and moisture. Patented rubber cores cushion the ground wires and help prevent breaks from kinks and runovers. The neoprene jacket is extremely tough and abrasion-resistant. Every design and component has been job-tested under the most difficult conditions.

Why not call on the especially qualified Man from Anaconda to help with your cable problem? Or see your local Anaconda distributor. For new descriptive Bulletin DM-5818, "Anaconda Securityflex Portable Cables for the Mining Industry," write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

LIVE BETTER ELECTRICALLY

ASK YOUR **ANACONDA**® DISTRIBUTOR FOR **SHOVEL CABLE**

F

Fairbanks, Morse & Co. 8, 259
*Falk Corporation 221
Fanning-Schuett Engineering Co. 255
Farrell-Cheek Steel Co. 248
Farval Corporation ..... Inside Back Cover
Firestone Tire & Rubber Co. 216
Fiske Bros. Refining Co., Lubriplate Div. 246
Flexible Steel Lacing Co. 54
Foote Bros. Gear & Machine Corp. 227
Frederick Iron & Steel, Inc. 260
Frog, Switch & Mfg. Co. 232
*Fuller Company 205, 280

G

Gardner-Denver Co. 249
*Gates Rubber Co. 214
General Motors Corp. 73
Georgia Iron Works Co., Cottrell Engineering Division 71
Goodrich Tire Co., B. F. 51
Goodyear Tire & Rubber Co. 1
Groban Supply Co. 232

H

H & L Tooth Co. 14
Hamilton Rubber Div., Acme-Hamilton Mfg. Corp. 16-17
*Hardinge Company, Inc. 161
Harnischfeger Corporation 95, 200
*Hendrick Mfg. Co. 260
Hendrix Mfg. Co. 256
Henry Mfg. Co., Inc. 253
Hercules Powder Co. 75
*Hewitt-Robins 46-47
Heyl & Patterson, Inc. 42
Hough Co., Frank G. 201

I

*Ingersoll-Rand Co. 177
International Harvester Co., Construction Equipment Div. 44-45, 223, 230
International Nickel Co. 148-149
International Paper Co., Bagpak Division ..... Inside Front Cover
*Iowa Manufacturing Co. 101

J

Jaeger Machine Co. 220
Jeffrey Mfg. Co. 198
*Johns-Manville 242
Johnson Co., C. S. 253
*Johnson-March Corp. 234
*Joy Manufacturing Co. 262

K

Kaiser Engineers 61
Kansas City Hay Press Co. 252
*Kennedy-Van Saun Mfg. & Engrg. Corp. 128-129
Kensington Steel 142
Koehring Company 58-59, 253
Koppers Co., Inc. 202
*Kraft Bag Corp. ..... Back Cover

L

Lima Works, Construction Equipment Division, Baldwin-Lima-Hamilton Corp. 279
*Link-Belt Company 11
Lubriplate Division, Fiske Bros. Refining Co. 246
Lukens Steel Co. 3

M

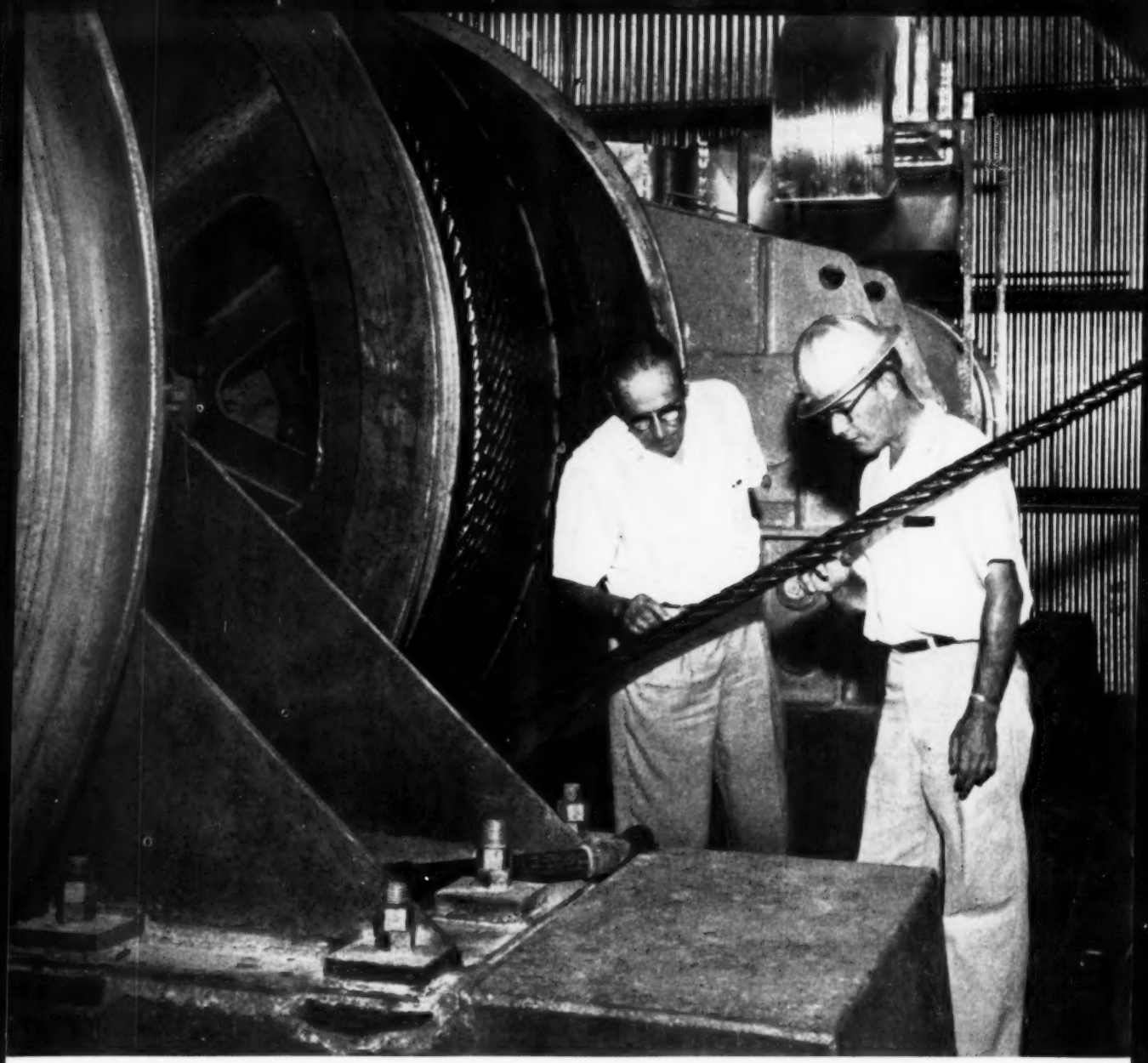
*Macdonald Engineering Co. 150
Mack Trucks, Inc. 38-39
Manhattan Rubber Division, Raybestos-Manhattan, Inc. 174-175
Manitowoc Shipbuilding, Inc. 229
Marion Power Shovel Co. 235
*McLanahan & Stone Corp. 126, 127
McNally Pittsburg Mfg. Co. 203
*Merrick Scale Mfg. Co. 168
*Minneapolis-Honeywell 257
Monsanto Chemical Co. 119
Murphy Diesel Co. 218

N

National Wire Cloth Co. 253
*Naylor Pipe Co. 222
Neff & Fry Co. 190
New York Rubber Corp. 160
Nicholson Co., Inc. 169
*Nordberg Manufacturing Co. 166-167
*Northern Blower Co. 114
Northwest Engineering Co. 5

*See also Detailed Information in 1957 Pit and Quarry HANDBOOK and CONCRETE INDUSTRIES YEARBOOK.

Enter 277 on card, page 211 →



Healthy after the first million tons. This is the hoist house at Pima Mine, near Tucson, Arizona—first southwestern mine to use skip hoists for open-pit operations. Because of the steep pitch of the ore body (45 degrees), the Pima management decided that skips would be more economical than conventional open-pit methods.

Two skip cars working in balance haul copper sulfide ores and waste to the top of the pit. Each of the cars weighs 15 tons and is capable of handling 22 tons of ore, dirt, and rock. Pitch of the skipway is a steep 38 degrees. Both drums of the hoist are rigged with Bethlehem wire rope, 1⅞-in. Purple Strand, 6 x 25 W. The photograph above shows one of these ropes under inspection, after the system had lifted its first million tons. The rope and its twin were both found in excellent condition, ready to start work on the second million.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Bethlehem rope for the following industries and numerous others:

MINING • QUARRYING • CONSTRUCTION • EXCAVATING • PETROLEUM • LOGGING • MANUFACTURING

BETHLEHEM WIRE ROPE

BETHLEHEM STEEL

O

Olin Mathieson Chemical Co., Ramset Fastening System, Winchester-Western Div. 144

Orton Crane & Shovel Co. 199

Overstrom & Sons, Inc. 33

P

*Pangborn Corporation 41

Pekor Iron Works, Inc. 34

*Pennsylvania Crusher Div., Bath Iron Works Corp. 113

*Pettibone-Mulliken Corp. 240

Plibrico Company 143

Porter Company, Inc., H. K. 29

Productive Equipment Corp. 100

Q

Quaker Rubber Division, H. K. Porter Company, Inc. 29

R

Ramset Fastening System, Winchester-Western Div., Olin Mathieson Chemical Corp. 144

Raybestos-Manhattan, Inc., Manhattan Rubber Division 174-175

*Raymond Bag Corp. 215

*Raymond Division, Combustion Engineering, Inc. 132-133

*Remington Arms Co., Inc. 225

*Research-Cottrell, Inc. 116-117

Rollway Bearing Co., Inc. 60

Ross Engineers Ltd. 50

Ross Screen & Feeder Co. 50

S

*Sauerman Brothers, Inc. 238

Schaffer Poidometer Co. 172

*Schramm, Inc. 231

Service Recorder Co. 4

Sinclair Refining Co. 247

SKF Industries, Inc. 251

Sly Mfg. Co., W. W. 145

*Smidth & Co., F. L. 97, 131, 147, 178

*Smith Engineering Works 37

Southern Tire Co. 228

Sprague & Henwood, Inc. 53

Standard Metal Mfg. Co. 262

Star Wire Screen & Iron Works, Inc. 248

Sturdrill-Keystone Co. 36

Stearns-Roger Mfg. Co. 176

Stenberg Mfg. Corp. 244

Stoody Company 239

Straub Mfg. Co. 43

*Sturtevant Mill Co. 241

*Syntron Company 9, 260

T

Texas Company 6-7

*Thomas Foundries, Inc. 195

Timken Roller Bearing Co., Rock Bit Division 237

Tool Steel Gear & Pinion Co. 151

*Transall, Inc. 32

*Traylor Engrg. & Mfg. Co. 263

Treadwell Engineering Co. 146

*Twin City Iron & Wire Co. 262

*Tyler Co., W. S. 233

U

Union Wire Rope Corp. 20-21

United States Rubber Co. 204

*United States Steel Co. 208, 217

*Universal Engineering Corp. 240

V

Victor Equipment Co. 224

Vulcan Iron Works 209

W

West Virginia Pulp & Paper Co. 102-103

*Western Machinery Co. 236

Whitmore Mfg. Co. 165

Willfley & Sons, Inc., A. R. 98

Winpower Mfg. Co. 55

*See also Detailed Information in 1957 Pit and Quarry HANDBOOK and CONCRETE INDUSTRIES YEARBOOK.

Enter 279 on card, page 211 ➔

LIMA...built to stay on the job-
keep output up, costs down

Every day Limas throughout the world are proving their worth in every type of excavating or crane work. Carefully engineered for modern, high-speed operation, these rugged, powerful machines handle the toughest stripping, digging, loading and lifting jobs with effortless speed. Their built-in stamina assures high output with lowest downtime. Easily maneuverable they move and work in the tightest spots, getting jobs done well ahead of schedule. Fingertip precision air controls pave the way for smooth, easy operations. For assignments calling for electrically powered machines, all Limas are available with optional electrical power package. Combining a single AC electric motor with a single stage torque converter, this drive matches, *electrically*, diesel-torque converter performance. You get maximum power performance under all operating conditions . . . and the motor won't stall or burn out. Lima quality design and construction extras make for profitable, efficient operations with minimum downtime. There's a Lima type and size for every job—shovels to 6 cu. yds., cranes to 110 tons and draglines variable. Smaller capacities are available on rubber. For full details, contact your nearby Lima distributor, or write to Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

Limas are available in three types of mountings — crawler, wagon or truck—for all types of service.

Lima Austin-Western crushing, screening and washing plants for portable or stationary operation.

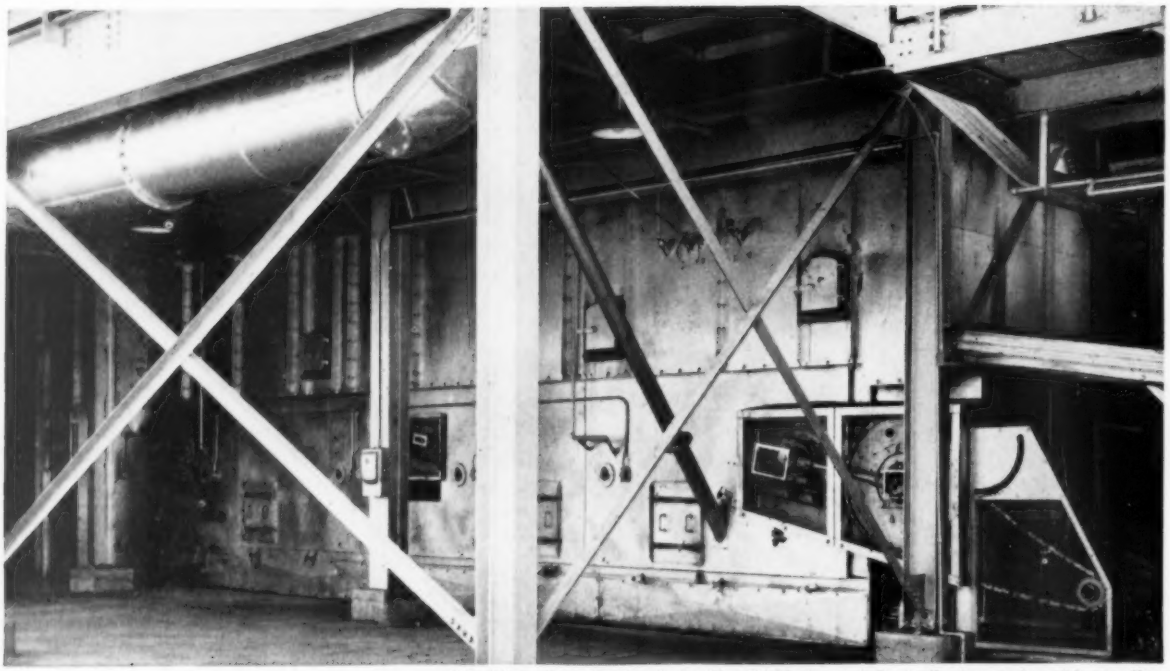
DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

LIMA SHOVELS · CRANES
DRAGLINES · PULLSHOVELS

BALDWIN BLH LIMA-HAMILTON

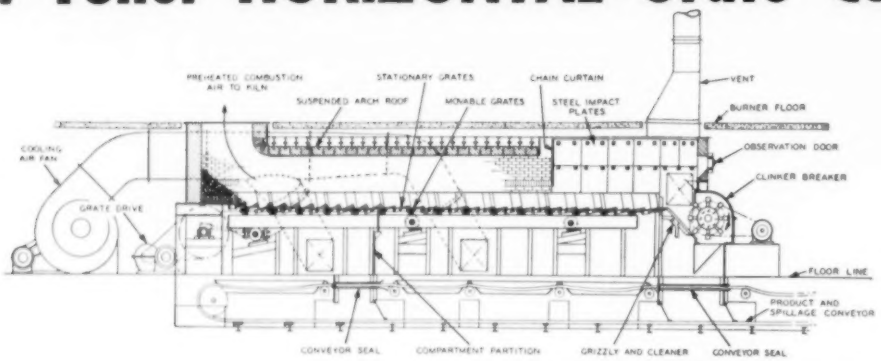
BALDWIN-LIMA-HAMILTON
Construction Equipment Division — LIMA WORKS

OTHER DIVISIONS: Austin-Western • Eddystone • Electronics & Instrumentation
Hamilton • Loewy-Hydropress • Madsen • Pelton • Standard Steel Works



Side View from feed end of a 7' x 44' Horizontal-Grate Cooler, designed for cooling 4,000 barrels of Portland cement clinker per day, showing crank type grate drive

New Fuller HORIZONTAL-Grate Cooler



Cross-section drawing showing construction and arrangement of a typical Horizontal-Grate Cooler with clinker breaker.

Compact . . . Economical . . . Fast-cooling. Already proven in use, the compact, efficient design of Fuller's new Horizontal-Grate Cooler promises savings for many plants. It's an ideal choice where headroom is at a minimum . . . where a short, compact unit is desired.

Like the famous Fuller Inclined-Grate Cooler, the new Horizontal-Grate type is meeting with wide acceptance. One of the new units, already in operation, is shown above.

A Fuller Horizontal-Grate Cooler or an Inclined-Grate unit is the right answer to your cooling needs. Fuller coolers are used for a wide range of materials including lime, dolomite, cement clinker, iron nodules, phosphate nodules, sinter, ores, and others. Fuller sales engineers will be glad to discuss your cooling problems and make recommendations for your plant—without obligation, of course.

Features of the Fuller HORIZONTAL-Grate Cooler

- Requires a minimum of headroom
- Short length if necessary
- Better secondary air temperature control
- Less refractories
- Less installation time
- More rapid clinker distribution
- More uniform bed thickness

FULLER COMPANY
GENERAL AMERICAN
TRADE MARK

Fuller
. . . . pioneers in harnessing AIR

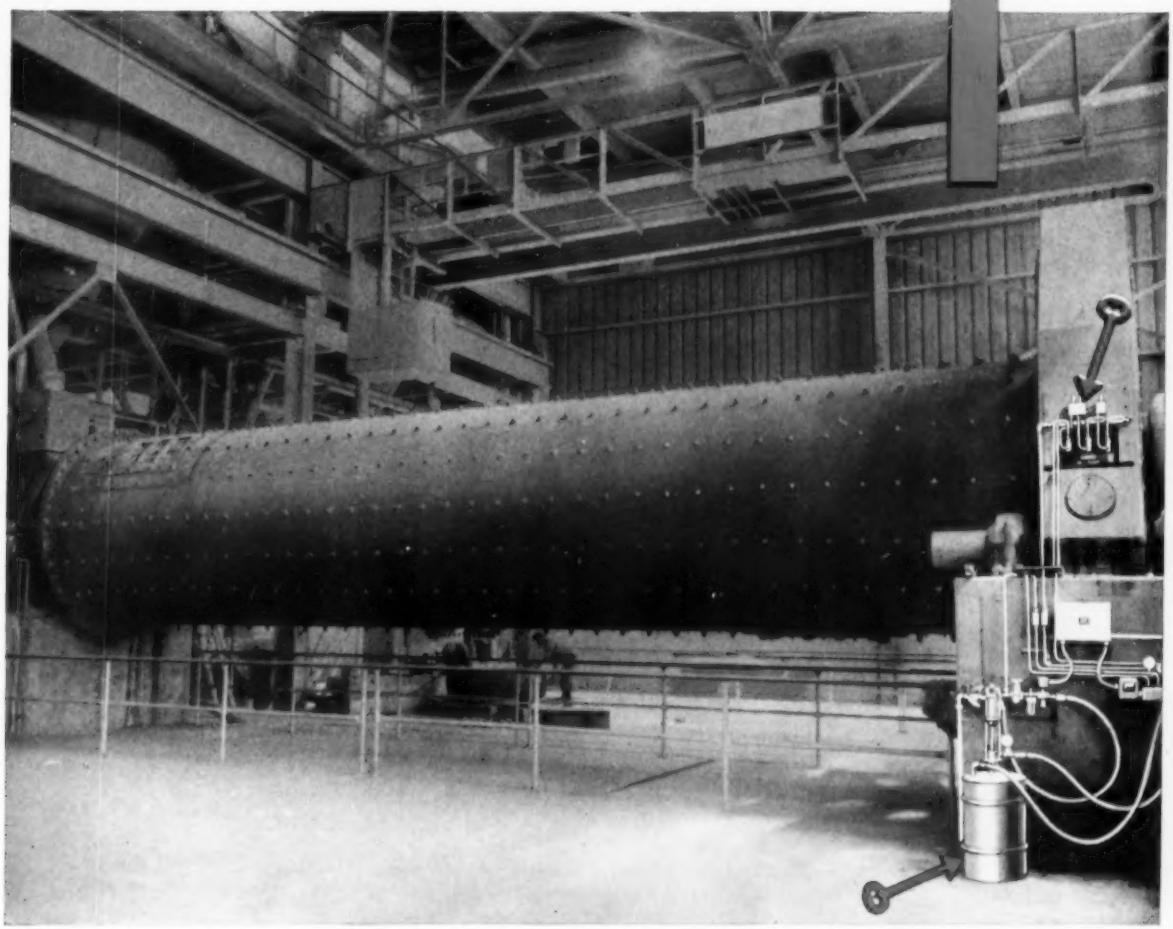
FULLER COMPANY
100 Bridge St., Catasauqua, Pa.
SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION
Birmingham • Chicago • Kansas City • Los Angeles • San Francisco • Seattle

4578
CO-38

"See Chemical Engineering Catalog for details and specifications".

Farval Spray Panel lubricates ball mill at Canada's farthest north cement plant

FARVAL—
Studies in Centralized Lubrication
No. 198



● Lubrication of the ball mills for this most northerly cement plant is sure, safe and economical. The main gears and pinions are protected by a Farval system of automatic spray lubrication.

This mill is located in the $12,500,000 cement plant built recently at Edmonton, Canada, and now operating at near capacity to serve the expanding industry centering in Alberta's booming oil fields.

Farval automatic lubrication also is growing—in wider and wider use throughout industry and in ever increasing benefits to users. Hundreds of spray lubrication systems have been installed on gears and sliding surfaces. Millions of bearings are served by Farval manual and automatic systems.

There's a Farval system designed to serve your needs, too. It can save you money 4 ways—in oiling labor, in reduced downtime of equipment, in bearing expense eliminated and in lubricant saved.

Ask us to mail Farval Bulletin 26-R. And a representative will call at your convenience. The Farval Corporation, 3280 East 80th Street, Cleveland 4, Ohio.

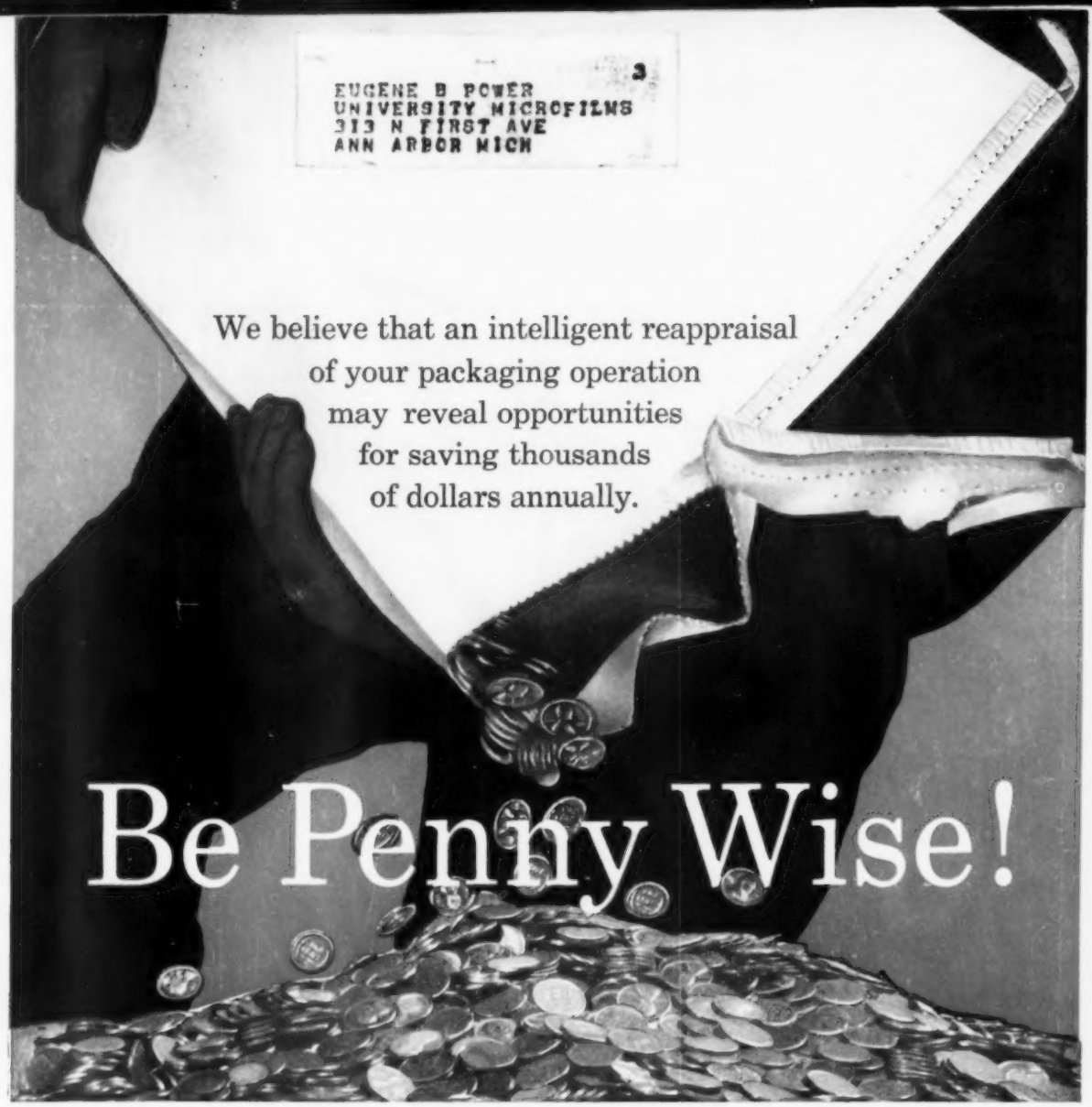
Affiliate of The Cleveland Worm and Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.

KEYS TO ADEQUATE LUBRICATION—
One of five 2-compartment 8′ x 37′ Allis Chalmers raw mills at Inland Cement Company Limited. Note Farval Automatic Spray Lubrication System at right above. Controlled by a timer, Farval sprays high viscosity grease on gear and pinion every 6 minutes.

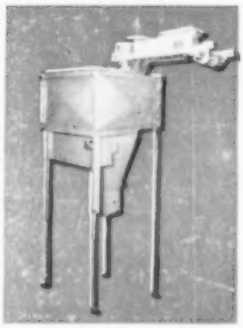
FARVAL
CENTRALIZED SYSTEMS OF LUBRICATION

Enter Cover 3 on card, page 211

EUGENE B POWER
UNIVERSITY MICROFILMS
313 N FIRST AVE
ANN ARBOR MICH



IN BUYING MULTIWALL BAGS NO SAVING IS TOO SMALL TO IGNORE!



THE KRAFTPACKER Open Mouth Bag Filling Machine, for free-flowing material, automatically saves pennies, too, through higher production and greater accuracy. Requires a lower investment and maintenance cost than any other automatic machine of its type in use today!

KRAFT BAG CORPORATION

Gilman Paper Company Subsidiary

630 Fifth Avenue, New York 20, N. Y.
Daily News Bldg., Chicago 6, Ill.

Integrated mills at St. Marys, Georgia and Gilman, Vermont

Exclusive Sales Agents for Kraftpacker

Show me how to save on my multiwall bag packaging.

Gilman PAPER CO.

COMPANY .....

ADDRESS .....

CITY ..... ZONE ..... STATE .....

PRODUCT MFD. .....

NAME .....

PO

Enter Cover 4 on card, page 211